HOUSE OF LORDS SESSION 1995–96

SELECT COMMITTEE ON SCIENCE AND TECHNOLOGY

INFORMATION SOCIETY:
AGENDA FOR ACTION IN THE UK

EVIDENCE RECEIVED UP TO 31 MARCH 1996

Printed pursuant to the Order of the House of Lords *of 21 November 1995*

LONDON: HMSO
£22.90

HL Paper 77–I

22501831060

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INFORMATION SERVICE
1749 -3 JUL 1996 XNA Hall
Wellcome Centre for Medical Science

LONDON: HMSO
£22.90

HL Paper 77–I

CONTENTS

ORAL AND WRITTEN EVIDENCE

Page

Department of Trade and Industry

Written Evidence 1
Oral Evidence, 30 January 1996 18
Supplementary Written Evidence 26

Office of Telecommunications (OFTEL)

Written Evidence 30
Oral Evidence, 30 January 1996 42

Cable Communications Association

Written Evidence 48
Oral Evidence, 13 February 1996 54
Supplementary Written Evidence 63

Aslib

Written Evidence 67
Oral Evidence, 27 February 1996 69

British Library

Written Evidence 87
Oral Evidence, 27 February 1996 90

National Council for Educational Technology (NCET)

Written Evidence 97
Oral Evidence, 5 March 1996 107
Supplementary Written Evidence 114

Department for Education and Employment

Written Evidence 116
Oral Evidence, 5 March 1996 119
Supplementary Written Evidence 128

Janice Hughes, Spectrum Strategy Consultants

Oral Evidence, 19 March 1996 129

The Newspaper Society

Written Evidence 135
Oral Evidence, 19 March 1996 138

Microsoft Corporation

Written Evidence 145
Oral Evidence, 26 March 1996 150

WRITTEN EVIDENCE

Aspen Consultancy 160
Bank of England... 161
British Association for Information and Library Education and Research, Heads of Departments and Schools Committee 162
British Computer Society (on behalf of the Engineering Council) 165
British Standards Institution 170

Cable and Wireless plc ... 172
CCTA ... 173
Christian Action Research and Education (CARE) ... 177
Communication Workers Union ... 189
Confederation of British Industry (CBI) ... 191
De Montfort University... 196
Direct Marketing Association ... 198
Dow Jones Telerate Ltd... 207
Economic and Social Research Council (ESRC) ... 211
European Communications Network (ECN) ... 214
European Informatics Market (EURIM) ... 219
Federal Trust ... 221
Further Education Development Agency (FEDA) ... 223
Mr J M Harper ... 225
Heriot-Watt University, Professor Roy Leitch ... 228
ICL plc ... 229
Institute for the Management of Information Systems (IDPM) ... 232
Institute of Management Services ... 242
Intervid Ltd ... 244
Joint Information Systems Committee ... 245
Law Society ... 246
Library and Information Commission... 246
Library Association ... 251
Ofsted ... 255
Policy Studies Institute, London ... 258
Reuters ... 271
Royal Academy of Engineering ... 275
Royal College of Nursing ... 281
Royal Society of Edinburgh ... 284
Stephen Saxby, University of Southampton ... 286
Scottish Office ... 287
Society of Public Information Networks (SPIN) ... 289
Standing Conference of National and University Libraries (SCONUL) ... 290
Teacher Training Agency ... 291
Telecential Communications ... 294
John Tomlinson, Member of the European Parliament for Birmingham West ... 295
Universities and Colleges Information Systems Association (UCISA) ... 297
UK Education and Research Networking Association (UKERNA) ... 300
University of Leeds ... 302
University of Oxford ... 303
University of Warwick ... 304
Welsh Office ... 307
Virtual Precincts Ltd ... 308

CALL FOR EVIDENCE

The House of Lords Science and Technology Committee has appointed Sub-Committee I to conduct an enquiry into the *Information Superhighway; Applications in Society.*[1] The Sub-Committee invites written submissions on matters of relevance to this topic, but in particular on the questions listed below.

Note: For the purposes of this enquiry the term "Information Superhighway" has been taken to mean a publicly accessible network capable of transferring large amounts of information at high speed between users.

1. What is the current form of the "Information Superhighway", and how is it developing (i) in the United Kingdom and (ii) worldwide? What specific problems arise from incompatible network standards and why are these incompatibilities arising?

2. What services are being provided, and should be developed/will be required, within for example the following areas:
   (i) public information,
   (ii) commerce,
   (iii) finance,
   (iv) education,
   (v) industrial training,
   (vi) health,
   (vii) social services, and
   (viii) entertainment?

3. Who will supply these services to consumers in the United Kingdom? How can the participating companies be categorised and what is the nature of the commercial relationships between them? How are suppliers likely to develop? What *service* standards exist and how are they likely to evolve?

4. How can universal access to services provided for the common good be secured within a commercially competitive market framework?

5. What is the role of central Government in connection with the "Information Superhighway" service provision, including the following areas:
   (i) leadership;
   (ii) promoting inward investment;
   (iii) promoting and safeguarding the interests of UK firms worldwide;
   (iv) promoting network compatibility;
   (v) access to Government information;
   (vi) security of payment;
   (vii) data protection, confidentiality and censorship;
   (viii) verification of information; and
   (ix) promoting the development of UK-orientated software?

6. What is the role of local and regional Government in connection with the "Information Superhighway"? How can new services be used to boost (a) the ongoing regeneration of urban areas, (b) other local economies?

7. What will be the impact of the "Information Superhighway" on working practices and employment prospects?

8. Is the dominance of mass-market US software a threat or an opportunity? What hard *commercial* initiatives can be made (as opposed to "collaborative" ventures such as RACE or ESPRIT) to respond to this dominance?

---

[1] On 9 May 1996 the Committee agreed that the title of the Report resulting from this enquiry should be *"Information Society: Agenda for Action in the UK."*

MEMBERSHIP OF SUB-COMMITTEE I

Lord Butterworth
Lord Craig of Radley, GCB, OBE
Lord Flowers, FRS
Lord Gregson
Lord Haskel
Baroness Hogg
Lord Hollick
Lord Phillips of Ellesmere, KBE, FRS (Chairman)

SPECIALIST ADVISER

Professor Charles Oppenheim

MINUTES OF EVIDENCE

TAKEN BEFORE THE SCIENCE AND TECHNOLOGY COMMITTEE (SUB-COMMITTEE I)

TUESDAY 30 JANUARY 1996

Present:

Butterworth, L.	Hogg, B.
Craig of Radley, L.	Hollick, L.
Dixon-Smith, L.	Phillips of Ellesmere, L. (Chairman)
Flowers, L.	Selborne, E.
Gregson, L.	
Haskel, L.	Porter of Luddenham, L.

Memorandum by the Department of Trade and Industry

INTRODUCTION

The Government welcomes the Committee's enquiry and its well-chosen timing and direction. We are at an important stage in the transition to a society based upon the acquisition, dissemination and exploitation of information. The Government has sought to move the debate on from who connects whom into which superhighway to what the superhighways can do for the economy and society at large. By focusing on the wide-ranging nature of information superhighways and the services they may support, the Committee is playing an important role in the transition to the Information Society.

The questions posed by the Committee in its call for evidence were extremely wide-ranging. In the relatively short space of time available, the Department has confined its detailed written evidence at this stage to those areas where we have appropriate specialist expertise, providing only a general outline in others. In this memorandum, we have assumed a degree of technical knowledge consistent with having read the Department's memoranda of evidence to the House of Commons Trade and Industry Select Committee's enquiry into Optical Fibre Networks [session 1993–94, ref. 285-v].

The key issues are: what services are offered over the superhighways, how they can be used to advance Britain's competitive position and how they can benefit society as a whole.

[DEFINITION—

the term information superhighway has been taken to mean a publicly accessible network capable of transferring large amounts of information at high speed between users]

1. *What is the current form of the Information Superhighway and how is it developing*

(i) in the United Kingdom

(ii) World-wide

The Department welcomes the Committee's chosen definition of a superhighway. It encompasses multi-component systems rather than prescribing any particular means of delivery. This allows the debate to extend much wider than the narrow question of fibre-optic links. We have taken this definition to include the "narrowband" Public Switched Telephone Network (PSTN), the Internet and also the "one to many" broadcast media, where digital transmission offers exciting possibilities. Indeed, the Government attaches considerable importance to promoting the availability of alternative, competing infrastructure and this remains a central element of our regulatory policy. It is an important underpinning for sustainable competition in the long term, particularly as industry convergence brings pressures for varying degrees of vertical integration between information production, conveyance, service delivery and equipment manufacture.

NARROWBAND PSTN

Currently, the dominant medium of communication and delivery of what are commonly perceived to be superhighway applications and services is still the PSTN. Here modern data compression techniques significantly enhance the effective bandwidth. The remarkable boom in public demand for on-line services is also a reflection of the UK's liberalised, highly competitive telecommunications market. The strong competition between the 100 or so Internet service providers has helped to drive down prices. This has been facilitated by a liberal class licensing regime for the provision of on-line services. Further, the promotion of infrastructure competition through the regulatory framework has created a market structure that has allowed Internet service providers to buy capacity for their backbone links from a variety of sources. Thus, the UK is benefiting from the development of multiple, interconnecting information superhighways.

The savings that can be made by carefully selecting amongst the competing telecommunications network and service suppliers are substantial. As an illustration, the cost of telephone calls has fallen by 35 per cent in real terms since 1984. This cost effectiveness and versatility of the PSTN has supported a remarkable increase in modem sales. The installed base of voice band modems is estimated to have grown by some 27 per cent in 1994 and 35 per cent in 1995, as prices have fallen. Thus, with higher speed modems, and more effective compression techniques, the bandwidth of a simple telephone line appears to be adequate for home use of many of the current generation of superhighway applications.

WIDEBAND ISDN

However, for business use, the higher capacity of Integrated Services Digital Network (ISDN) lines is becoming more popular. Owing to their intermediate bandwidth capacity, these are sometimes referred to as "wideband" networks. Competition is also developing rapidly in the ISDN market with significant savings of around 30 per cent being offered on ISDN connections by some of the cable companies.

The home user may well follow the trend to ISDN as prices fall further in response to competition and as the bandwidth required by superhighway applications increases beyond the reach of compression technology on narrow band networks. Thus the availability of greater bandwidth in the reaches of the network closer to the home will become a more important factor. It is possible that the life-span of the narrowband copper twisted pair, commonly used in the final drop to the home, could be extended by remarkable advances, made notably by BT, in Asymmetric Digital Subscriber Line (ADSL) technology. Currently under trial, this technology can support, over copper wire, high-bandwidth television reception on the incoming channel and lower bandwidth control information on the outgoing channel. It can thus support a degree of interactivity. However, as indicated by BT's recent announcement of its outline plans to upgrade its network, in the medium to long term, optical fibre will come closer to the home. The final drop to the communication socket in the home may then more often become co-axial cable, which is fully "broadband" capable.

BROADBAND CABLE

Coaxial cable on the final drop from a fibre-optic network is the system generally used by the 143 cable television franchisees to deliver analogue television services to their customers. The complexity of analogue television signals required the installation of completely new broadband capacity, leading to the development of the cable networks. The commitment to regulatory stability given by the government in 1991 has brought forward an investment commitment of £10 to £12 billion over the course of this decade from the cable franchise-holders. Of this, £5.1 billion has already been spent. Further investment of around £2 billion is scheduled for this year, which will create over 2,000 extra jobs. To date this new fibre-optic network has passed more than 5 million of the 16.2 million homes within the franchise areas in the UK, and connected some 500 schools without charge. Plans for 1996 anticipate that a further 2.7 million homes will be passed by cable this year.

The committee will be aware of British Telecom's plans, announced over Christmas, to upgrade their network to fibre-optic cable as far as their street cabinets. The Government welcomes this move as a strategic response to the competitive pressures which have been able to emerge as a result of its commitment to a stable regulatory environment. Such a move represents a further positive contribution to the development of diversity in broadband superhighways within the UK.

There are also some established broadband networks developed for particular communities of users. One such example is SuperJANET. This provides broadband connectivity in a core network between academic institutions to facilitate collaboration and exchange of information.

DIGITAL MEANS BROADER BANDS

A switch to digital transmission offers a step-change in the capability of the existing alternative networks as it allows much more effective use of the available bandwidth. For example, cable television networks have a capacity of some 50 analogue channels but can support some 500 to 1,000 digital channels, depending upon assumptions made about digital compression. As such, digital technologies will provide the next significant step to high performance superhighways, supporting ever more complex services. A digital system would have more than enough capacity for a full range of television, audio and data (Internet) services, with the advantage of a return-path built into the system allowing a high degree of user control and interaction.

The transition to digital broadcasting will require considerable investment, for example, by the cable companies. Given the massive front-loading of their existing capital investment programmes, they have not yet begun to make a profit. However, given a stable regulatory regime, the leading companies are likely to be able to sustain continued investor confidence—so policy on the provision of entertainment services will not be reviewed before 2001. The review will take place then assuming that effective competition has developed in the market place. In this environment the cable companies may well be able to switch to digital transmission within the next two years, or sooner if competition from digital terrestrial and satellite broadcasts intensifies.

However, the level of market demand for interactive television and services such as video on demand (VOD) or near video on demand (NVOD) is as yet unclear. Indeed, traditional terrestrial television programming still takes a significant share of viewing in households serviced by cable and satellite providers. Trials of interactive services are being run over the existing analogue networks in several franchises, as much to explore the economic viability of these services as to develop and test the technology. With its proposals in the Broadcasting Bill, currently before Parliament, the government is seeking to provide an environment in which the market has real opportunities and incentives to take the development of digital services forward.

Existing interactive trials often involve a high degree of collaboration between equipment suppliers and content providers. Equipment being further developed includes modems designed to provide data transfer directly to the cable network. For data transfer to a personal computer (PC) or a bespoke set-top box, such cable modems can offer a very high bandwidth, up to 4Mb/s. In the USA demand for high-bandwidth access to on-line services, such as the Internet or services provided by the cable operator itself, has led to the launch of new, cheaper cable modems. This is a trend we expect to see developing in the UK over the next 18 months, as the cable companies seek to differentiate their product bundle by offering very high capacity access to the Internet and similar on-line services.

Broadband Wireless

With the move to digital technologies speeding convergence of different market sectors, radio spectrum will increasingly be able to play a valuable role in the implementation of the superhighways. Radio links have potential uses in providing the full range of superhighway services from UK-wide broadcasting through to telephone and data links, particularly for remote areas.

The UK is one of the world-leaders in the development of digital broadcasting. Not only do we have world-class manufacturers and content providers, but we are also developing an enlightened regulatory framework to facilitate infrastructure investment. The Government's August 1995 White Paper set out a framework for the development of digital terrestrial television in the UK. The White Paper referred to the development of broadcast digital data services alongside the television signals. There is considerable potential for the use of this datastream to deliver superhighway applications of all sorts, especially when combined with a return path to a control centre through the PSTN. The possibility of digital satellite offers the possibility of quickly developing UK-wide coverage.

Special modems are available for the current GSM and PCN digital mobile telephones, which further increase the flexibility of a lap-top PC. The nature of mobile telephony is such that there is more variability of service than the fixed PSTN and higher bandwidths are not available. The Department is actively engaged in supporting the UK's share of the advanced research necessary to develop the next generation of mobile and personal communications technologies. The subsequent (third) generation of mobile phones, should have a higher bandwidth capability, developing a whole new market in high performance mobile computing.

The Department, as part of its commitment to increase the choice in telephony for all users, has taken a number of steps to promote the use of wireless transmission in the local loop. In certain remote rural areas, where cabling would not be practical, the Government has made portions of the radio spectrum available for telephony. Two national licences for the use of radio to provide telephony to homes and businesses have been issued, with services due to commence rolling-out in the first half of this year. The radio fixed-link service will be capable of ISDN, communicating through a dish-like aerial/transmitter on the roof of the customer's premises. Applications for further licences, covering the 2 and 10 Ghz frequency bands are currently the subject of open competitions. In a number of cable franchises, plans are also being implemented to deliver cable television through microwave technology (MVDS), making broadband entertainment services more economically feasible in less densely populated areas.

International Development of Information Superhighways

The quality and scope of international comparisons of information superhighways has been variable. The Department has therefore commissioned a study into international benchmarking of information superhighways which will be concluded later in the year. When results of the study become publicly available, the Department will forward them to the committee to assist it in its enquiry. In general terms, however, the UK has taken a strong leadership position within Europe on the liberalisation of telecommunications infrastructure, and, as far as we can determine at the moment, is in the front rank within Europe on indicators such as the use of E-mail by commercial companies.

What specific Problems arise from incompatible network standards and why are these incompatibilities arising?

Standardisation for Information Superhighways is carried out in different ways at different points of the value chain.

NETWORK STANDARDS

At the most basic level of the value chain are standards for network interoperability. Here the problem is to make sure that a large number of geographically dispersed networks operated by entities that are increasingly in competition with each other can be interconnected to form a seamless web. This involves not only the physical interconnection of circuits but also the interworking of network intelligence between networks and agreement on addressing, so that messages are correctly routed from the originator to the recipient. Of equal importance is that, where a number of network operators are involved in a delivering service from one point to another, a way has to be found to bill the user and allocate an appropriate share of the income to each operator.

Standardisation at the network level is carried out within organisations fitting a traditional model. At the international level the main body is the International Telecommunications Union (a United Nations agency). At the European level, the European Telecommunications Standards Institute (ETSI) carries out the work. ETSI is mandated by the European Union to carry out telecommunications standardisation for Europe, and most companies interested in telecommunications in Europe are members. In 1995, some 75 companies out of a membership of around 340 were from the UK and this included many SMEs.

On the whole, this standardisation process works well, although it can be rather slow. It is very helpful to the process that the standardisation programme and the standards themselves are determined by companies and organisations with an economic interest in using them. The Department's officials play an active role at the top management level within ETSI to ensure that the Institute carries out its work to the benefit of UK-based companies and that it is sufficiently responsive to the need for change.

SERVICE STANDARDS

Above the basic network level standards needed to make use of the networks. Here the problem is to agree an architecture that will allow entrepreneurs to exploit the basic network infrastructure. At present this is developing in the manner of a client/server model whereby users (the clients) demand services and information from computers and databases (the servers) across the networks. Internet works in this way and a similar approach has been adopted by the Digital Audio Visual Council (DAVIC) who have proposed a client/server architecture capable of supporting high speed digital multimedia applications of all sorts.

DAVIC is a voluntary international association which has been highly influential in its work. It consists of many multimedia and telecommunications companies operating outside the traditional standardisation framework. Such an approach brings the advantages of speed, focusing effort towards meeting market demands. There are some problems though, including the question of how, in the future, to maintain and develop standards that may still be used extensively, but are no longer at the cutting edge of the technology and so may not attract resources.

APPLICATION STANDARDS

At a higher level of the value chain still, there may be a need to develop some standardisation of approaches to the way that applications exploit the client/server model and how users access content lodged in the servers. There is a careful balance to be struck, however, between encouraging investment and early standardisation.

An example is provided by conditional access services for pay television programmes. These ensure that only those who have subscribed to a programme service can view its broadcast signal. A company is likely to be encouraged to invest more in the development of a solution more quickly if, by advancing a proprietary solution, appropriate to market demand, it can gain some first-mover advantage. An early commitment to such investment is likely to lead to wider availability of equipment and so reduced prices more quickly. On the other hand, users may also gain if they can access competing services from one piece of equipment, operating a common standard.

In the case of European digital television, the standardisation needed to ensure this balance was agreed by the members of the Digital Video Broadcasting Project and subsequently formalised by ETSI. This two-stage process was able to meet both rapidly-changing market conditions (in the DVB) and the need for formality (in ETSI) to underpin an important part of the investment case for digital television. The Department has been active in these fora and in encouraging UK players in the commercial sector to take part.

At the top of the value chain are the software applications that allow consumers to make benefit from the services and content on offer. Some key markets are currently led by a few dominant players. Microsoft has become almost synonymous with the personal computer, but the rapidly changing state of the market in superhighway applications has led to their position being challenged by new players such as Netscape, who have designed the most widely-used World Wide Web browser.

The need for rapid product development and product differentiation mean that this market is likely to be determined by proprietary, de facto standards for the foreseeable future. The interface between software and hardware and between two pieces of software must be open and available to all players. This may be achieved by appropriate standardisation of what is known as the Application Programming Interface.

INTELLECTUAL PROPERTY RIGHTS (IPR) AND STANDARDS

Any standardised technology or interface for the information superhighway is certain to incorporate intellectual property. For formal standardisation to take place, the availability of licences to use this IPR must be assured to all players on fair reasonable and non-discriminatory terms. On the other hand, IPR that is not essential to a standard should be available to the owner to form part of his competitive edge if he chooses. This is a very controversial subject and although attempts have been made to solve the problem internationally, these have not yet been fully successful.

2. *What services are being provided, and (should be developed/will be required) within for example the following areas:*

(i) public information
(ii) commerce
(iii) finance
(iv) education
(v) industrial training
(vi) health
(vii) social services and,
(viii) entertainment?

The picture for services under the above headings is mixed. In certain sectors, notably commerce and finance, there are already substantial levels of business activity, generating hundreds of millions of pounds with the potential for rapid further growth. In other areas, notably in delivering services to the domestic consumer there is considerable potential; however, there remains considerable uncertainty about which services will be most attractive to which sections of the public and how they might best be delivered. As a result, services are generally at the stage of being run on trial rather than offered as a fully commercial service. The main UK trials include:

- the BT on-demand trial in Ipswich/Colchester—covers some 2,500 homes providing on-demand services including TV, films, shopping, education, games and home banking. This runs mainly over copper wires using ADSL technology.
- the Cambridge Cable/On-line Media trial of interactive TV in Cambridge—will cover up to 50 homes and includes services such as personalised news, films on demand, education, music, games and home shopping.
- interactive service trials by the cable companies, including NYNEX, Telewest, Bell Cable Media and Videotron, covering areas such as education and training, community projects, business development and healthcare.

All of these trials include attempts to test economic and technical feasibility of interactive multimedia applications in society. Listed below are some additional examples of services being developed in this area.

(i) PUBLIC INFORMATION

There are two principal means by which information is provided electronically to the public.

The Internet

The CCTA have established the CCTA Government Information Service (CGIS) on the World Wide Web. CGIS provides information from some 180 Government and public sector bodies. In addition eleven Departments such as this Department, the Treasury and the Central Office of Information have their own Internet servers which they use to make information available to the public. CGIS provides a front-end indexing service to all these servers, thereby acting as a single point of access and helping to improve accessibility. HMSO is also looking to improve access to Government documents by trading over the Internet. The Central IT Unit, has recently been established in the Office of Public Service, to co-ordinate the Government's use of IT, including the involvement of private sector finance for large new applications.

Within and around all these activities, CCTA has set up a number of Collaborative Open Groups to stimulate on-line discussion of significant issues concerning the Information Superhighway and its use by government.

Other countries' governments are increasingly making information available to their citizens over the Internet. Indeed, CCTA is playing a leading role on this front by jointly co-ordinating the G7 Government On-Line project, together with the Treasury Board of Canada. Private sector organisations are also increasingly using the Internet to publish information of interest to the general public. In the specific area of public libraries, museums and arts facilities, for example, the Department of National Heritage is investigating the scope for national co-ordination in securing investment in Information Technology, in particular seeking to involve the private sector more.

Kiosks

The CCTA, with the Benefits Agency, are developing a kiosk providing access to a range of government information. Kiosks can be positioned in public buildings, such as benefit offices or post offices, and thereby provide access for all to information and to services, such as vehicle licence applications. The system developed now incorporates an Internet connection so that information made available through CGIS can be accessed as well as information specific to the kiosk system.

(ii) Commerce

Industry applications

The PSTN and private circuits are the principal means to date by which companies are providing a range of services. Notable are database access services which include on-line databases, audiotex and videotex; and messaging and transactional services, which include E-mail, booking systems, EFT/EFTPOS, voice messaging and video-conferencing. The information access market was worth some £1.2 billion in the UK in 1992, of which on-line databases accounts for £750 million. In 1994, messaging and transactional services were worth in the region of £300 million and forecast to grow at 10 per cent per annum.

The electronic exchange of information should be facilitated by the G7 Information Society Pilot Project "A Global Marketplace for SMEs". This aims to contribute to the development of a global electronic environment for the open and non-discriminatory exchange of information. This global network, based on the Internet, aims to improve the competitiveness of companies by helping them carry out their business operation and management more efficiently. Already the use of electronic mail (E-mail) is spreading for this purpose. Recent surveys indicated that nearly 50 per cent of large companies in the UK were using E-mail in some form—a figure comparable to that in the US, and one of the highest in Europe. Of small and medium sized enterprises, around 9 per cent are estimated to be using external E-mail, again a relatively high figure in Europe.

The Internet is increasingly used to facilitate trade between companies and other collective organisations. Directories of companies have been created on the Internet—the most notable a probably CommerceNet and IndustryNet which were initiated in the US. The Department is currently considering the need for support to stimulate the development of an equivalent UK directory.

Companies are also increasingly using Electronic Data Interchange (EDI) to streamline processes dependent upon the input of data in a standard format—purchasing is the most common area in which EDI is used as it avoids re-entry of order details. The Department is assisting the British Accounting Software Developers Association in the development of standard interfaces between EDI and popular accounting packages. This would make EDI more accessible to SMEs in particular.

Debenhams has around 340 suppliers world-wide connected to its EDI network. By the new year, it will have installed a system to automatically convert EDI messages into faxes. This will bring into Debenhams' EDI network an extra 600 smaller suppliers that are not yet truly on-line. Over 6,000 UK Dentists send electronic forms to the Dental Practice Board in order to make claims for payment. A system is being installed for fund-holding GPs to manage their budgets in a similar way. More generally, the use of public and dedicated private networks to provide services such as video-conferencing and mobile links to corporate databases, increasingly means that distance is no longer an obstacle to doing business between widely separated sites.

It is becoming easier to buy goods and services over the Internet, where 35,000 firms advertise their wares, as the private sector finds innovative solutions to secure payment across electronic networks. The Government has been lobbying hard to ensure that the recent Distance Selling Directive did not impose an unnecessary burden upon companies selling goods and services in this manner.

Applications for the Individual Citizen

Home shopping and home banking services have taken off in the US, and some services are in the early stages of development in the UK. Examples in the UK include home shopping and banking services which are being run in trials by both BT and Cambridge Cable, and commercial software to support personal share transactions launched by Apricot.

(iii) FINANCE

Electronic trading has already transformed the financial sector and brought about true globalisation of financial markets. EFT and EFTPOS have transformed the retail sector.

There are a whole range of financial management tools available from software suppliers. Although the corporate financial sector pioneered the use of on-line data services, many management products are off-line at present eg CD-ROM or computer disk based. It is likely that packages will increasingly become available over networks.

In the insurance sector, the world's six largest insurance brokers have joined forces with BT to set-up a global electronic communications network. When the WIN (World Insurance Network) goes live next year it will not only use EDI for communication, but include electronic document management to reduce reliance on paper.

(iv) EDUCATION

The Department for Education and Employment's (DFEE) consultation booklets on Superhighways in Education provide an assessment of the opportunities in education and training. The Department has worked with DFEE on certain aspects of the education superhighways activity and, in addition supports a National Information Infrastructure Task Force lead project called Schools On-Line. The project aims to explore the scope for beneficial application of the Internet in schools. The education sector is also one of the areas upon which the Multimedia Industry Advisory Group has focused its attention. A copy of its report is attached for information. The DTI is working with DFEE in these projects to open up access for schools, Further Education colleges and Universities.

(v) INDUSTRIAL TRAINING

It would be more appropriate for the Department for Education and Employment to comment in detail on this area. However, there is much discussion in industry of the increasing need to move to life-long learning, so that people improve and adjust their skills as necessary throughout their working lives. Many companies and organisations (including this Department) make use of computer-based training and interactive learning packages. Currently, the majority of these packages are off-line but it is expected that on-line access to learning material will become increasingly common. This is likely to be especially so in fast-moving industries where skills frequently need updating, such as information and communication technologies.

(vi) HEALTH

It would be more appropriate for the Department of Heath and Social Security to comment in detail on the services and applications available in this area. Here also the UK is playing a positive role, with around £170 million invested in the NHS information network, supporting developments such as remote diagnosis. However, healthcare was another application area considered by the Department's Multimedia Industry Advisory Group, whose report is attached.

(vii) SOCIAL SERVICES

It would be more appropriate for the Department of Heath and Social Security to comment in detail on the services and applications available in this area. The Benefits Agency have been working with the CCTA to develop the Information Kiosk referred to under "Public Information". A software package designed to provide guidance about the different State benefits available has been developed to run through the kiosk.

(viii) ENTERTAINMENT

It would be more appropriate for the Department of National Heritage to comment in detail on the services and applications available in this area. However, this Department does have special responsibility for the video games industry. Separate markets exist for console and PC-based games, but the size of the overall European market in 1995 was estimated at £2.2 billion, of which the UK accounted for some 23 per cent (£509 million). The ability to play games against a number of opponents has led to a considerable increase in the market for multi-player games within dedicated computer networks.

There is considerable on-line activity in traditional games such as chess and draughts, which are relatively simple to play using a modem and the PSTN. More complex graphics-based games that are "playable" using a modem are less common. As the capacity of networks increases and methods of charging for games-playing improve, there should be a considerable increase in the quality and demand for on-line games. BT is developing a system to allow more on-line, interactive game-playing over the PSTN.

3. *Who will supply these services to consumers in the United Kingdom? How can the participating companies be categorised and what is the nature of the commercial relationships between them? How are the suppliers likely to develop? What service standards exist and how are they likely to evolve?*

The services referred to in Question 2 cover so many sectors of the economy that it is not practical to list here *all* potential suppliers. However, there is already a thriving sector composed of the following services, sometimes known as Value Added Services or VADS, which cut-across the sectors referred to in Question 2:

- Electronic Data Interchange (EDI);
- Electronic Transfer of Funds (EFT);
- EFT at Point of Sale (EFTPOS);
- E-mail;
- Fax Store and Forward;
- video-conferencing;
- computer reservations systems;
- the management of data and telecommunications networks;
- information access services.

Amongst existing supply companies are large multi-nationals who offer a range of the above services, whether PTOs or others (eg BT, AT&T, C&W, GE Information Services, IBM) and companies specialising in particular sectors (eg PIPEX, CompuServe, INS, VANCO). In some sectors, specialist user groups are significant, for instance, Amadeus and Galileo in booking systems, and, in electronic funds transfer, SWIFT, which is jointly owned by several hundred banks.

The market surrounding the information superhighway is so complex and dynamic that it is difficult to forecast. For some services, today's key players may survive as the market evolves, in others, completely new suppliers will emerge. The sudden reversal in the fortunes of IBM, the rise of Microsoft and the recent arrival of Netscape were not widely predicted. In this connection, however, it is clear that developments on superhighway applications front clearly impact on the more established markets such as PC hardware and software. The relative contributions of these different components of the value chain is discussed in the answer to Question 8.

The Department has recently commissioned a study into the UK datacommunications supply market, to examine future product drivers in the equipment market. It will consider the effect of the Internet and the information superhighway, and also assess the capability of the UK industry to meet the opportunities and threats. Subject to commercial sensitivities, the report is expected to be published in late spring.

Market Structure

The theoretical four-section model of the market for superhighways services provides a starting point for study and an aid to discussion. The model depicts the industry as divisible into four sections; content providers; service providers; network operators and consumer premises equipment suppliers. In the simplest form, the content providers supply intellectual property (say an animation or a piece of text) to the service providers who package and market content that they have amassed from a number of different sources a service bouquet. The service providers then contract with the network operators to deliver the content to the consumer (say over a satellite or cable), but the final display takes place on whichever piece of the customer's consumer premises equipment (say a PC or television) is connected to the network.

Like most models this approach has a number of shortcomings. The commercial interrelationships of a real market are far more complex and there is considerable overlap between sections. The model does, however, provide a useful reference tool for monitoring anti-competitive behaviour. The OFTEL consultation paper "beyond the telephone, the television and the PC" contains further discussion of the four-section model in the context of superhighway services.

In some markets there is already considerable vertical integration across the four sections. Where a new market is developing that requires considerable commercial investment the Government would seek to avoid over-regulation of any temporary dominant position where that would stifle the development of the market.

In more mature markets, however, competition law should seek to remedy distortions of the market and anti-competitive practices. The Government has recognised that, in some markets, it is necessary to put in place an initial regulatory framework to give companies as much certainty as possible when considering investment decisions. The January 1996 policy document issued by the Department on the regulation of conditional access services for digital television is a good example of the need to set out a regulatory framework in advance to ensure full and free competition in a new market.

SERVICE STANDARDS

For a discussion of service standards, please refer to the answer to Question 1.

4. *How can universal access to service provided for the common good be secured within a commercially competitive market framework?*

The general policy on the maintenance of the Universal Service Obligation is formally a matter for the Director General of Telecommunications. OFTEL is currently consulting on a range of possible options.

THE PRESENT POSITION

The Universal Service Obligation (USO) requires that consumers be provided with direct access to a telephone network and must have the ability to make and receive voice calls at a reasonable price. In a commercial market this may require some intervention to ensure that telephone services are available to groups who it might otherwise be uneconomic to serve, for example, those living in remote rural areas.

The licences of British Telecom and Kingston Communications (in Hull)—the longest established, and originally public service operators—contain a number of additional specific conditions implementing the USO within their regions. These include, for example, requirements to:

- meet all reasonable demand for basic telephone services, including those in rural areas;
- provide public call boxes, unless certain criteria are satisfied;
- provide free public emergency call services.

These licence obligations are enforced by the Director General of Telecommunications, who has the power to make orders compelling operators to comply with their licence conditions. Within the competitive framework established by the Government's regulatory policies, the practical realisation of the USO is demonstrated through the take-up of telephone service provision which has risen from 78 per cent to 91 per cent of households since 1984.

THE FUTURE

In a liberalised multi-operator environment new operators win customers from established operators and may also establish exclusive coverage in areas of new construction development. The USO therefore needs more formal definition and arrangements need to be developed to share the costs of the USO more equitably between the different operators. Continuing technological progress also drives up the level of service which can reasonably be expected, so agreement on the appropriate level of USO is also needed.

The consultation being undertaken by OFTEL exposes these issues along with many others. The Government awaits the outcome of this consultation with interest. Without prejudice to the outcome of the Director General's review, the Government would hope to see equitable and sustainable arrangements emerge which would not harm the competition developing in the market place.

5. *What is the role of central government in connection with the information superhighway service provision, including the following areas:*

(i) leadership

(ii) promoting inward investment

(iii) promoting and safeguarding the interests of UK firms world-wide;

(iv) promoting network compatibility;

(v) access to Government information

(vi) security of payment;

(vii) data protection, confidentiality and censorship;

(viii) verification of information; and

(ix) promoting the development of UK-oriented software ?

The Government recognises that the investments and innovations of the private sector will continue to play a key role in developing the potential of information superhighways. The competitive framework maintained by Government—in relation both to communications services in particular and economic activity in general—encourages this process. The Government also sees a necessary and significant role for itself in each of the following areas:

(i) LEADERSHIP

The emergence of superhighways, and associated developments in the character and use of information and communication technologies, are beginning to make a big impact on different areas of the economy, and of society as a whole. Yet we are still in the early stages of a long-term process, and there remains considerable uncertainty about the precise nature of the many changes that will occur. In this situation, the Government assumes a leadership role. This consists of:

(a) "Vision": recognising the significance of superhighways, and articulating this to others. The Government's November 1994 Command Paper on Superhighways was a first step in this direction, followed up by speeches, such as the Right Hon Michael Heseltine's speech to the Institute of Directors on 14 June 1995, and major policy statements such as the Education Departments' two papers on Education Superhighways in 1995. The work of the Technology Foresight panels is also helping to inform and to develop this vision.

(b) Promotion and support: promoting the benefits of using superhighways, and providing practical support to help organisations and individuals to take advantage of the opportunities. The focus for this activity will be the DTI's Information Society Initiative, due to launch shortly. Support to the Science & Engineering base is also provided, for example, through Foresight Challenge funding; proposals currently being shortlisted include several which address IT and communications priorities through, for example, the establishment of centres of excellence;

(c) Policy development: adapting its own policies and practices in the light of changes in technology and markets. The proposals contained in the Broadcasting Bill now before Parliament, and last year's consultative document from the Office of Telecommunications on the future regulation of "broadband switched mass-market services" or superhighways, are examples of how regulatory policies are being adapted. Government also needs to adapt its practices in the light of these changes, for example by making good use of electronic mail and the Internet to communicate with industry, as DTI increasingly does.

(ii) PROMOTING INWARD INVESTMENT

The DTI has long promoted inward investment, which is seen as offering significant economic benefits for the UK. The Department aims to help encourage the process of inward investment by drawing the attention of overseas investors to the attractions of the UK as a dynamic, entrepreneurial, flexible economy, with high skills and productivity and a supportive commercial environment. This encouragement takes place both proactively and reactively.

Inward investment is particularly important for the development of information superhighways—both as regards the underlying infrastructure and the services available to users—since this process benefits greatly from efficient transfer and utilisation of capital, technology, skills and creative ideas. The UK's strong performance in developing superhighways owes much to the decision of major international communications, computing, media and electronics manufacturing companies to make very substantial investments in the UK. One of the main reasons these and other companies have seen the UK as a good place to invest is because the UK liberalised its telecommunications market more quickly and extensively than other industrial countries. For example, the reciprocal liberalisation of International Simple Resale of telephone capacity with countries such as the US, has reduced the cost of international calls through the UK. Many of the major international Japanese companies in these fields have also invested in the UK, for instance Fujitsu, Matsushita and NEC. A number of these companies are involved not only in manufacturing, but also in research, design and development. The cable industry regard their UK ventures as a test-bed for wider entry into Europe while firms developing mobile services undertake extensive research and development here because of our lead on advanced services such as GSM. The international character of the UK industrial base in the communications, computing, media and electronics manufacturing sectors strengthens the UK's ability to respond successfully to opportunities in what is increasingly a global marketplace.

(iii) PROMOTING AND SAFEGUARDING THE INTERESTS OF UK FIRMS WORLDWIDE

A liberal trading environment in which open and fair competition can thrive will accelerate the deployment and use of information superhighways. The DTI supports this cause *multilaterally* through agencies such as the World Trade Organisation, the European Council and the International Telecommunications Union, and *bilaterally* with individual Governments that place restrictions on the investments or operations of UK organisations and individuals.

With persistent and consistent encouragement from the UK, the EC Council of Telecommunications Ministers has agreed to liberalise telecoms services and infrastructure across most of the Community by the start of 1998. This will provide UK telecoms sector with new opportunities to supply telecoms services in the rest of Europe. The European Commission has now tabled all the necessary proposals to create a single market in telecommunications by 1 January 1998.

This framework provides the backbone of the EU offer in the WTO negotiations currently ongoing in Geneva, which are aimed at liberalising telecommunications networks and services worldwide. The policy of liberalisation and competition is the key to ensuring that the major potential benefits of the information society can be realised. Within Europe the Government is particularly keen to encourage the European Commission to ensure that the liberalisation agreed is indeed genuine.

(iv) Promoting network compatibility

Efficient and effective development of superhighways requires a high degree of compatibility between the various communications networks and with the terminal equipment attached to the networks. For example, the success of the Internet in attracting an estimated 35 million users has been predicated on the availability of acceptable technical interface protocols, notably http and the World Wide Web. Over the past three or four years the speed at which specifications for new systems and interfaces are being agreed internationally has been increased enormously. This has been mainly due to the formation of industry-led international groups such as the DVB (European Project for Digital Video Broadcasting) and DAVIC (the Digital Audio Visual Council). Consensus within these groups can be quickly translated into standards by the relevant international standards bodies. DTI has played an important role in the formation and development of the DVB in particular, and in promoting adoption of the resulting standards, both in the UK and internationally.

Many of the issues of network compatibility and interconnection were considered in a report by the Multimedia Industry Advisory Group, published by DTI on 14 December 1995. The key conclusions were:

- uncertainty over standards may deter investment in multimedia but the high pace of change makes this to some extent inevitable
- tariffs for high-speed circuits are also a deterrent, particularly across borders, though prices will fall as more demand is registered
- standards are best fixed by industry players on a voluntary basis within international bodies that exist for the purpose; content-providers could make a stronger contribution to these discussions
- the regulator is well attuned to interoperability and related competition and tariff issues
- the Government should be cautious about extending special regulation to deal with interoperability problems and about applying cross-media and broadcast regulation to multimedia services
- the Government, as a significant holder of information and purchaser of communications, could help to stimulate multimedia development.

(v) Access to Government Information

Information superhighways have the capability to make large amounts of information available to users in a convenient form at the touch of a button or the click of a mouse. The Government recognises the great potential of the Information Superhighway to increase access to official information and the benefits. This can deliver benefits measured not only in public interest terms, but also in terms of the efficiency of processes within Government and in terms of the general competitiveness of the UK. The Government is working to realise this potential through the Information Society, Competitiveness and Open Government Initiatives.

The most pervasive information highway at present is the Internet. As part of its efforts to fulfil its objectives on open government, DTI, in common with other Government Departments, has set up its own information site on the World Wide Web of the Internet (the electronic address is: http://www.dti.gov.uk). This makes available information on a wide range of subjects such as the internal structure of individual sections of DTI, contacts within DTI for particular services, press releases, publication lists and what's new in DTI. This will soon include information on the Information Society Initiative and the Management in the 90s programme. So far there have been more than 27,000 accesses to the DTI site since May 1995. As well as using the Internet as a means of publishing information, DTI officials use it to obtain information, and to communicate with industry and other contacts through electronic mail.

The CCTA, the Government Centre for Information Systems, operates an information site for the Government as a whole (the electronic address for the Government Information Service is: http://www.open.gov.uk). This has recorded 5.9 million accesses since November 1994. They have also been awarded "Computing" magazine's gold award as "UK Internet User of the Year".

DTI is responsible for implementing Government objectives on tradable information (guidelines attached). It is recognised that information is a valuable commodity and one of the Government's objectives is to make as much Government-held information as possible available for the information sector to turn into electronic information services. It is also recognised that Government has a role as a market driver in promoting the use of the superhighway as a user itself.

At the same time, Government must balance openness needs with the need to protect the interest of the taxpayer. Thus while selected information is provided free of charge in the public interest, other material carries a charge, whether because it is being supplied as a commodity to be exploited commercially by the user, or simply in order to recover costs. In both cases the principle followed is that the costs (and where appropriate a full commercial return) from producing information should fall upon the user rather than the taxpayer. In placing information on the Internet, Departments need to have regard to this, given that free electronic access could potentially dent revenue streams generated by paper sales of priced publications, with knock-on effects on their budgets (and ultimately for the taxpayer).

Government must also consider carefully the difficulties of protecting the authenticity and integrity of material once it is on an open network. The lack of protection against unauthorised downloading and reproduction of materials currently prohibits the placement of certain classes of information (eg cartographic), although Government is aware that developments in charging and protecting information on superhighways may soon overcome some of these concerns.

(vi) SECURITY OF PAYMENTS

Advances in technology have rapidly changed the traditional methods of business and retail activity. Market forces are driving organisations to consider more efficient ways of conducting business. The advent of electronic trading between businesses and the increasing availability of electronic shopping, has seen a steady increase in the number of electronic transactions and consequently an increase in the opportunity for fraud.

For a true electronic payment or cashless society to exist, there needs to be confidence between transacting parties: that personal financial information such as account numbers remain confidential thus preventing fraudulent use by an unauthorised person: that funds are available; and that the other party is who they say they are.

The financial sector have themselves recognised the need for secure payment and have introduced several systems to cope with different demands. Methods of encrypting credit card details are now regularly supplied in Internet software products. Token-type electronic card systems have also been introduced such as Mondex, an "electronic purse" solution pioneered by National Westminster Bank, the Midland Bank, BT and others. Many other organisations are replacing traditional credit cards with Smart Cards, which can hold a greater amount of information, are harder to read and duplicate, and can support more technically advanced authentication, such as biometrics (physical attributes such as fingerprints).

The DTI has been keen to support advances in this type of technology in conjunction with general promotion of cryptographic techniques (see below). We were also instrumental in setting up the UK Biometrics Association (the first of its kind) and have recommended that the European Commission include work on biometrics within their next programme of work on information security issues. Government (especially the Treasury) also has a role in ensuring that the development of electronic payment systems, especially those involving electronic cash, do not adversely affect financial regulation or monetary control. As part of the Information Society Initiative, DTI intends to publish a brochure describing how firms can take simple precautions to safeguard their systems whilst exploiting the advantages of being on-line.

(vii) DATA PROTECTION, CONFIDENTIALITY AND CENSORSHIP

Of all the issues concerning the emergence of the Information Society, and the use of Information Highways, these are among the most sensitive. Clearly the take up of the new technologies on offer (such as electronic commerce and personal E-mail) will be adversely affected if users (be they citizens or businesses) perceive that their information may be intercepted or read. Of equal importance is that information stored on citizens (in-so-called cyberspace) is secure and strictly-controlled (in terms of access) under the existing Data Protection legislation.

Data protection

The European Commission's amended proposal for a draft Directive on data protection rules in the telecoms sector (COM (94) 128) supplements the general Directive on data protection which was adopted last autumn and which also applies to the telecommunications sector (as to any sector). The draft Directive aims to harmonise the protection of personal data and privacy in the provision of public telecommunication services in Member States. Significant provisions of the Directive cover provision of encryption on demand; Data processing for billing purposes and access to billing and "traffic" data; Itemised billing and privacy of "calling users" and "called subscribers"; Calling line identification; Call forwarding; Directories; Interception and surveillance of communications and use of loudspeakers and/or recording of calls; Unsolicited calls for promotional or advertising/research purposes.

The amended proposal has been read through once last year, during the Spanish Presidency, in the Council Working Group which is about to reconvene during the Italian Presidency. The Italian Presidency is hoping to achieve a common position at the May Telecommunications Council. The UK Government is seeking, through the negotiations, to ensure a proper balance between data protection concerns on the one hand and the need to devise practical solutions which do not impose an excessive burden on industry, on the other.

Confidentiality

Fortunately, cryptographic technology which allows information to be encrypted—thus securing its privacy - already exists and will, DTI believe, help to ensure that the confidentiality and privacy of information is secured. Unfortunately the widespread use of strong encryption techniques has drawbacks: if used by criminal or terrorists they may well prevent the authorities from monitoring their activities, through legal interception, thus endangering citizens and national security. DTI are, therefore, keen to explore and promote solutions to the encryption problem which might "balance" the requirements of business and citizens with those of Governments to counter crime and terrorism. Inter-departmental discussions are taking place (under the auspices of the Cabinet Office) to explore these issues and the DTI is also contributing to discussions on encryption policy within the European Union and OECD.

Censorship

The Internet is subject to the same laws as any other media as regards obscene material (or libellous, or racially provocative material). It has been encouraging to see successful prosecutions of people for downloading paedophilic material from the Net. There is also concern about children gaining access to unsuitable material on the Net. Here, appropriate screening software can provide an important safeguard. DTI are working with the Home Office and the industry to devise technical or procedural solutions of this sort. The committee may be aware of the success of British companies in this field. One such company—Firefox, based in Solihull—has recently developed such a package, realising a very substantial return on their investment. This illustrates the opportunities available for British firms in superhighways applications, and the role the market can play in helping to address those problems which do exist.

It is important, if the potential of the Internet is to be exploited the full, for the benefit of all sectors of society, that it does not acquire the reputation of containing large amounts of illegal or unsuitable material. However, the nature of the Internet does of course present difficulties for enforcement of the law and control of access to material. The Government is monitoring the situation to see whether further action is necessary and if so, what might be feasible and effective.

(viii) VERIFICATION OF INFORMATION

Along with ensuring that information remains confidential and private, the integrity of an individual's (or a business's) information is the main security requirement for transactions (of whatever nature) on the Information Highway. DTI is, therefore, acutely aware of the need for both citizens and business to have the appropriate tools to be able to have confidence that the information, or data, they transmit is nether altered, tampered with or copied. Conversely, confidence is required that information received (eg contract or account details) has not been altered in any sense.

Fortunately the technology to secure the integrity, and authentication, of information is available. So called "digital signature" techniques are already being used on the Internet to secure both business and financial transactions. The DTI has been keen to promote such technology and recently sponsored a workshop to explore the industry requirements for digital signature technology; what standards were required for its use and the role the European Commission might play. Subsequently HMG has been lobbying the Commission to introduce standards both for the technology (ie the nature of the cryptographic algorithms) and the infrastructure required to support the use of digital signatures on an EU basis.

(ix) PROMOTING DEVELOPMENT OF UK-ORIENTATED SOFTWARE

DTI has a sponsorship role in assisting the development of software in the UK. This is achieved through a number of initiatives aimed at helping the industry to help itself. A common theme is that networks between the companies themselves should be encouraged in order to share information and experiences, and to develop best practice. Some of these initiatives are listed below. It is likely that additional programmes directed at the promotion of UK-orientated software will be introduced as part of the Information Society Initiative.

In addition, DTI has published a series of reports on the markets for UK telecoms software companies, and their ability to meet the opportunities and threats (see attached—Telecoms Software—an opportunity for the UK?; Software Requirements of the UK Cable Communications Industry; Trading in Software Components—A Market Opportunity). The scope for UK-orientated software in the education and health sectors also received some consideration in the enclosed report of the Multimedia Industry Advisory Group.

Current DTI activities

TIME TO MARKET ASSOCIATION (TTMA)

The DTI sponsored TtMA was established in August 1993 to enable UK based companies, primarily from the electronics sector, to achieve world best practice in the management of product development, bringing new products and services to the market place quicker and more effectively, thus aiding competitiveness. Within the Association a Software Special Interest Group has been formed providing members with the opportunity to work together on specific subjects of common interest including software process, methods and tools. Members of the special interest group include IBM, Phillips Semiconductors, Sony and Domino.

BEST PRACTICE

DTI are supporting the development of Best Practice Guidelines to help with procuring IT systems. This will continue through the BuyIT campaign for which DTI support finishes in April. However, the contractor has secured sufficient sponsorship to enable it to continue. The results will be available in early summer. In addition, the DTI Business Links are increasingly supplying advice on IT support to small and medium sized businesses through experienced counsellors.

TELECOMS SOFTWARE CLUB

Following a report on the specialised market of Telecoms Software, a "lub" is due to be launched in February, bringing together companies in the sector from across the UK. Its objectives are to provide practical assistance through workshops, case studies, and bulletins in order to help companies win new telecoms business and sell their established strengths in telecoms software and services.

STARTS

STARTS is the UK Software Process Improvement programme (SPI). It was conceived as an update on the original STARTS manuals of the early 80s which gave best practice guidance on software procurement and development. The new STARTS is a joint initiative of NCC, DTI, CCTA and a number of UK software users in the telecommunications and financial sectors, all of whom provided pump priming finance. STARTS is still evolving (as is SPI) and aims to deliver through a number of closely focused and targeted workshops and seminars, and will be financed from attendance fees.

TICKIT

TickIT was started by the DTI in 1991 as a scheme to improve the quality management of software development. In particular it offered third party certification that the quality management systems of businesses conformed to international standards such as ISO 9000.

The scheme is very useful to software purchasers as it provides a means for assessing their suppliers. It is now run as a commercial concern by the British Standards Institution.

To date more than 850 organisations have received TickIT certification. There is substantial interest in the establishment of an International TickIT scheme and BSI are negotiating with several countries.

6. *What is the role of local and regional government in connection with the information superhighway?*

How can new services be used to boost

(a) the ongoing regeneration of urban areas

(b) other local economies?

This is a matter primarily for the local and regional authorities involved, although this Department has responsibility for certain aspects of regional policy, particularly in the administration of the European Community Structural Funds. The Government has introduced a number of schemes to encourage local communities to come forward with innovative solutions to the problems facing their area. Regional Challenge has emphasised an innovative approach to harness the energy and potential strengths of the region in awarding prizes from a £160 million pool of money from European Community Structural Funds. The successful bids included six electronic networking and information technology projects.

There are many examples of projects which are taking place at local level, often through partnerships between local authorities and commercial firms. One innovative example is the use made of multimedia technologies by Croydon library, which also houses a museum containing multi-media exhibits.

The Department is undertaking a number of case studies of superhighways demonstrator projects to inform its policy-making. It is expected that these may be used to spread awareness of the possibilities for superhighways and multi-media applications across the UK. The work of the Department, described elsewhere in this document contributes further to development at the local and regional level, as much naturally relies on national regulation, technological development and standards development.

7. *What will the impact of the information superhighway on working practices and employment prospects?*

The Department for Education and Employment takes the lead in this general area. In the context of industrial relations, for which this Department is responsible, the development of information superhighways clearly increases the scope for teleworking and other flexible working practices. The Government welcomes the growth of such practices, which can be of benefit both to employers in increasing business efficiency and to employees in helping them to reconcile work with family and other commitments.

The case of some teleworkers in the Highlands and Islands of Scotland illustrates the potential of these practices. Here teleworking is used to provide a number of services remotely, such as the preparation of abstracts from various journals. Such arrangements not only bring people in these remote areas into the productive economy, but also allow them to combine this work, which is generating new revenues, with the traditional ways of life in the region. The possibilities do not end here; for example, applications such as distance learning and remote medical diagnosis offer clear opportunities for improved educational and health services in such areas at an affordable cost.

While information superhighways may reduce the need for some tasks, they will also create new opportunities, as we have seen above, and even new industries, creating new jobs. Overall the opportunities offered should be positive for employment. While superhighways are therefore likely to mean some changes in patterns of employment, an attempt to ignore such changes would be much more damaging in the long term. Whatever the pattern of change, teleworkers, for example, are still covered by the same comprehensive framework of statutory employment protection rights as are those following more traditional working practices. Some rights apply only to employees working under a contract of employment, and some require a qualifying period of service, while many important rights such as rights against discrimination and unlawful deductions from pay apply to a wider range of workers from the first day of work. Part-time workers have exactly the same statutory employment rights as those working full-time.

Terms and conditions of employment for teleworkers, as for other workers, are matters for agreement between the parties concerned, according to their own priorities, needs and circumstances. The agreed terms and conditions form a legally binding contract which may be enforceable in the civil courts or the industrial tribunals.

Businesses too are finding new ways to work. Some are experimenting with home and mobile working - reducing their need for fixed office space to a central marketing point and records store. Employees keep in touch through a mixture of home and mobile computing links and pre-arranged meetings.

The use of E-mail, video-conferencing and other facilities is also supporting the development of "virtual organisations" and "virtual project teams". The superhighway applications are lowering the costs of productive collaboration and team working across corporate and geographic boundaries. Experience in virtual organisations related anecdotally to the Department suggests that the practice is maturing. At this early stage, it seems that such collaborations work best in the design/development phases of projects but that, for the time being at least, more traditional structures may still be needed for product marketing and support to the customer.

As mentioned in answer to Question 2, there has also been some impact on working practices in Government, as, for example, CCTA provides more of the public sector with economical access to the Internet using the existing Government Telephone Network, and more government information is made available on-line.

8. *Is the dominance of mass-market US software a threat or an opportunity ?*

What hard commercial initiatives can be made (as opposed to collaborative ventures such as RACE or ESPRIT to respond to this dominance ?

OPPORTUNITIES

Mass-market software, generally US-produced, has had the effect of increasing the total demand for and usage of IT. Its cheapness and usability have enabled many more users to adopt new technology. UK-based companies are clearly able to benefit from this increasing market demand. For example they can develop software and services for the global market that are compatible with, or provide components for those of industry leaders.

Furthermore, many US packages require customisation for the UK market. A large part of the cost of much packaged software is implementation cost. Databases are a particular example which cannot be adapted in the US for particular requirements in the destination markets.

Other opportunities arise as US packaged software companies are not generally thought able to provide support services of sufficient quality and scope. For example, Microsoft has only 14,000 employees world-wide and Oracle fewer than 10,000. There are many opportunities for the UK IT industry to capitalise on the provision of services for US mass market software suppliers. In 1995, for example, ICL entered an agreement with Microsoft to provide Helpdesk services for much of Europe. IBM is taking on 200 new members of staff for the provision of European Helpdesk software/hardware requirements. US software suppliers also find it beneficial to have a base in a country where English is the native language.

Only a small proportion of the true cost of software to the purchaser is accounted for by the price of actual software itself. The licence fees for PC software account for only 15 per cent of the total cost over a five year period (40 per cent for mainframe software). The bulk of the cost to the purchaser comprises support, education, administration and hidden costs (eg pulling others away from their work to solve a software problem). Some of the licence fees may be going to the US, but the service, support, administration etc. are less transferable.

Furthermore, the committee should note the importance of the information content sector in the overall value chain delivering services to customers. Recent estimates suggest that information content—including source creation, information development and packaging, such as books, electronic books and on-line databases—provide 48 per cent of the overall value-added. This proportion is likely to rise still further and compares to 38 per cent from distribution (networks) and 14 per cent for hardware and software. This reflects the fact that ultimately it is the quality of the information content provided in response to customer demand which will fuel the commercial successes of the information society.

The UK has some strong international players in this area, for example Reuters has its headquarters in London, and a considerable number of innovative SMEs. These companies are building on the widespread acceptance of the English language and the long-established trading links and pre-eminence in professional services of the City of London. An idea of the total value involved can be gained from a recent survey which estimated the market for electronic information for professional users in the UK at over £3 billion. Around 73 per cent of this was in exports, illustrating the strength of the content provision sector in the UK.

The UK has clear strengths which should enable our companies to take advantage of growing global opportunities. These include:

- strong software research capability;
- reasonably advanced application of IT in education;
- the English language;
- strength in games software writing;
- strong user industries such as finance, retailing and travel which have made good use of IT;
- relative to other European countries, high usage of networking, Internet in particular;
- strong content, publishing and broadcasting industries;
- strengths in certain key applications, eg virtual reality, financial software.

THREATS

The real threat is that UK based companies do not respond to the opportunities created in the fast-moving global market. The UK needs to capitalise on the strengths and opportunities outlined above.

The UK is currently dominant in certain niche markets. Some of these could be under threat. For example, the finance sector is one of a number of industry-specific markets in which the UK has a significant track record. UK companies, have a high proportion of the home market for accounting software for small and medium sized companies using Windows and UNIX (and of the French market through acquisitions). The potential threat is that such companies will be bought-up by larger international companies that specialise in these market areas. R&D can constitute up to a third of software producers'turnover, and smaller companies may find it easier to sell-out, rather than continue to bear this very high level of expenditure by themselves.

There are other specific, potential threats. These include:

- the possibility that the powerful international software companies are allowed to dominate related sectors in such a way as to stifle creativity. They might, for example, seek to dominate the content/publishing sectors, the provision of financial software etc. Such dominance would allow such software companies to constrain consumer choice, not only in the basic operation and applications software, but also in the specialist applications.
- that software is "bundled" with other products or sold in some way such that the true costs of production are not covered directly in the marketplace. This could constitute unfair competition for UK producers.
- that such an effective dominance is created that consumers are deprived of alternative, more innovative software.

COMMERCIAL INITIATIVES

Many UK based companies have already entered into commercial arrangements with the large US software/services providers. For example, they are providing the European servicing arm of the US software provider. Or they may enter into an agreement that US software packages can be incorporated into UK-supplied systems.

UK-based companies can also work together to raise awareness of the benefits of IT and communications, starting perhaps with the home markets. Having worked together to increase market interest, they can then proceed to compete for the enlarged market.

There are many such initiatives, some of which the Government is involved with. Examples are: the work of the National Information Infrastructure Task Force; the forthcoming Information Society Initiative; the DFEE "Superhighways Initiative".

Help is also available to inward investors into the UK. Northern Ireland is currently Europe's largest supplier of packaged software, with Microsoft, Lotus, Corel and Novell exporting more than $1 billion worth of software from the country. Assistance for inward investors can be critical to firms' location decisions.

January 1996

Examination of Witnesses

Mr W MacIntyre, Head of Communications and Information Industries Division, Mr J Neilson, Head of National Telecommunications Policy, Mr D Hendon, Head of Telecommunications Technical Affairs, and Mr N Worman, Head of Multimedia Unit, Department of Trade and Industry, called in and examined.

Chairman

1. Mr MacIntyre, thank you, and your colleagues, very much for coming. Before I ask you to introduce them and make any introductory remarks which you would like to make, I am sure you are aware that we are honoured this morning by the presence of a delegation from the Canadian Senate Standing Committee on Transport and Communications. The Canadian Senate and the House of Lords, of course, have a particular affiliation because of our many similarities. Speaking for the Committee, we are therefore particularly glad to welcome our Canadian friends and colleagues. Speaking for myself, I cannot help but remember that all too long ago I was for four years a landed immigrant in Canada, and they are four years that I remember with the greatest possible pleasure. I spent them in the main in Ottawa. Mr MacIntyre, would you like to introduce your colleagues?

(*Mr MacIntyre*) Thank you very much. What I thought I might say is to inform the Committee about the way in which the Department has been reorganised in terms of its work in this area. Since the beginning of January we actually have brought together all the areas of interest in the Department which you might say cover the information society, so we have merged telecommunications divisions with the multimedia unit which dealt with advisory applications and contents, with the electronics computing activities of the Department and with the publishing/recorded music area as well. Therefore, four different parts of the Department have been brought together within one division. I am head of that division which is called Communications and Information Industries Division. The aim is really to recognise that the technologies are converging, and that there is a rapid movement in this area and a need for the Department to handle this in a co-ordinated and very closely integrated way. We have tried to bring along today the people who, in the context of your enquiry, will bring a far higher degree of expertise than I will. If I can go from my right to my left, Neil Worman is head of the contents and applications part of the new division; his responsibilities cover the multimedia unit, so that he covers the whole of that area and the industries which actually deal with contents and applications, in so far as they fall primarily within our responsibilities. On my immediate left is John Neilson who is head of the branch which deals with the domestic market and establishing the market framework with the regulatory regime and the government policy on regulation. On the far left is David Hendon who is responsible for a range of the division's technical activities and leads that team; he leads on standards, he leads on IT security and he leads on the bulk of the division's R and D work.

2. Thank you. Do you have any introductory comments you would like to make?

(*Mr MacIntyre*) My Lord Chairman, I do not have any. What I wanted to do was to explain the organisation, and in the context of that organisation to say that what we are trying to do in terms of our organisation is to be organised to meet the three themes of the Government's policy work in this area. First of all we are aiming to be involved in the development of markets in this area, in the whole communications area, both here and overseas. We are looking at what the Government can sensibly and properly do to encourage the actual contents side of the market in terms of the infrastructure and what goes onto the infrastructure. The third area is our relationships with the industries which supply the market. There again, we need to think very carefully about, and our activities are focused upon, what role we can usefully play in adding to the efforts of companies in these sections. That is broadly how we are organised. I think we would prefer to get on with your questions.

3. Thank you very much. If I might begin with the first question, we seem to be setting up an overall system which is made up of a number of competing networks, so it is rather important that there should be interconnectivity between these networks and interoperability between these networks. Do you see any problems there? Is there any difficulty emerging?

(*Mr MacIntyre*) I would like David Hendon to deal with the substance of the question. If I could make an initial comment, we recognise the importance of developing standards which will enable the networks to work properly. Putting it at its simplest, what one wants is a situation where a person can send a piece of information from a location in one country to a location perhaps in another country, over perhaps as many as six or eight different networks. What one wants is for that information to go efficiently, quickly, maintaining its integrity so that people cannot steal it, so that the proper charging bases are there, and that the opportunities for exercise of bottleneck control in terms of anti-competitive practices are properly regulated. That is the sort of focus on which we are working. The importance of proper protocols and proper standards cannot be overstated, but one has to strike a balance between having standards which are either statutory or government led and standards which are developed by the industry as part of the way the industry works. I think that that is a very crucial distinction. Bearing in mind that we are talking about not just the United Kingdom/Europe but actually global interfaces, it is very important that we get that right. David Hendon is deeply involved in that, so perhaps I could ask him to elaborate.

(*Mr Hendon*) I think we can be reasonably happy with the situation regarding standards-making in the telecommunications sector, because what has happened is that there has been an increasing focus in recent years on the direct participation of companies which are involved in the business actually helping to make the standards which will govern how their business works in terms of interconnection and so on.

Chairman *contd.*]

This is happening in two ways really. One is within a sort of formal structure of standards bodies which have some relationship to the different Directives that apply to telecommunications under European Community law, and indeed under international agreements. Then more recently there has been an increasing involvement of companies involved in telecommunications in rather more voluntary and faster-moving activities outside the formal structure, where some players get together to standardise in an area which they see as needing action, they produce in a very quick and focused way the standards which they want and, just as importantly, they do not produce the standards which they do not want. As Mr MacIntyre said, it is often the constraints that a standard provides, in that there can be more disadvantages than advantages. If the standard creates a big market and creates market opportunities, that is good because companies working in Europe need the size of market to repay investment. On the other hand, however, if it constrains what they do, if it limits innovation or prevents them differentiating their service offering from each other, then the standard is probably unhelpful. One thing to say perhaps is that the traditional standards-making process, as we have said in our memorandum, is effective but slow. The main body that is involved in standards making in Europe is a private sector body called the European Telecommunications Standards Institute of which the Government is a member—in fact, all the European governments are members, but there are some 350-odd other members, so the influence is very widespread. That body is currently re-engineering itself (to use a piece of current jargon) to make itself faster and more responsive to market needs. The DTI have been involved in this process. Indeed, one of our officials led the team which made the proposals, and I am involved as vice chairman of the committee which is implementing the proposals. So we are not at all complacent. Although we feel that things are going reasonably well, we are not at all complacent, and we are constantly encouraging the European players to look and see what changes need to be made.

Chairman] Thank you very much.

Lord Flowers

4. Mr Hendon has been talking as if he was confining himself to commercial networks, and I dare say you were. Would you have any say, or would you wish to have any say, over the development of academic networks like SuperJanet?

(*Mr Hendon*) I think the way you have put the question was would we wish to have any say. It is perhaps important to emphasise that the Government does not see that the Government should have a say in standards, except in the few cases where there are strong regulatory reasons. In general the vast bulk of standards are made by the market players for their own needs, and I do not think the Government should have a say; it should really be left to them to decide what standards they need to make the business work. Having said that, it is obviously desirable that academic networks and indeed any other networks make the best use of equipment that is designed for big markets, because it will be cheaper, and if they specify requirements which are different from the requirements of commercial networks then it will cost them dear in terms of implementing those networks. So in designing the voluntary standards for commercial networks I think it is important that all the players have the opportunity to contribute to what actually takes place. Therefore, I would see our role as trying to persuade academics to be involved in the process, in the same way as commercial players.

5. It sounds to me like, and it is reminding me a little bit of, the days when we were first introducing big computers into universities. There exactly the same thing was said by the then Ministry of Technology: that they ought to buy machines—which I will not mention—because those were in big commercial demand, but they were quite unsuitable for the academic purposes that we wanted, so we had to buy for a while American machines for that purpose. What you said reminded me rather of that state of affairs, and I hope you are not going to repeat the mistake.

(*Mr MacIntyre*) My Lord Chairman, perhaps I could add to some of the things David said. We have very close working relationships with the SuperJanet people. one of the G7 projects is in fact about global interoperability for broadband networks where we are in the lead, and indeed where one of the key players from the United Kingdom is on the working group. So that is about dealing with some of the concerns which you have, in that what we are trying to do is to make sure that something like SuperJanet, which is, we believe, in a world class, actually has a proper input into the development of these standards. Neil is quite close to this, so perhaps Mr Worman could say something to add to that.

(*Mr Worman*) I do not have a great deal of detail to add to that statement. This is one of the projects agreed at the G7 Summit which has been taken forward with United Kingdom lead and with Canada, Germany and Japan. A programme of work has been set up and is being pursued which I think does address the issue of interconnection of academic networks.

Lord Gregson

6. The history of commercial activity and setting standards is not a very good one throughout this industry, starting with the types of television transmission, then television recording which is a very famous one. I understand also at the moment that there is an awful lot of wrangling going on over a common language for programming within the Internet. Is it wise to leave it on that sort of basis, knowing the history. The history is pretty awful.

(*Mr Hendon*) My Lord Chairman, I think you can always find examples of where harmonisation did not work. It is deceptively seductive to believe that one knows best, or that a group of experts will know best and that when they finish their deliberations this would be the way that everyone adopts. If one does that one runs the risk of missing something quite important. Anyway, how do you choose the experts

Lord Gregson *contd.*]

so that you get first of all the right decision and indeed the ones who really should be deciding. So we tend to take the line that those who have to make the investments, be it in networks or in equipment design, should participate, should actually carry out the standardisation with all the governments involved, to the extent of making sure that there is a fair competitive market place and that the procedures of standardisation are open so that everyone has the chance to play. Then the outcome, to the extent that it does not have some particularly regulatory significance, should be allowed to find its own way.

7. How do you stop it splitting into two camps? You have (1) television systems, (2) video recording, (3) programming for the wider-screen television, and each and every one of them is split into two camps, is it not?

(*Mr Hendon*) Yes.

8. That stops progress. It is absolutely essential to stop that happening, but how do you stop it happening?

(*Mr Hendon*) What happens when you stop progress is that you bring forward the next stage of progress. Indeed, in the wide-screen television debate we feel strongly that our opposition to what Europe was doing in analog HTV brought forward digital television by several years and maybe prevented a huge waste of money in Europe not just for industrialists but for consumers as well.

9. And presented the Japanese with an absolutely open market to deal with, did it not?

(*Mr Hendon*) Yes, that is right. Indeed that is true, I cannot deny it.

10. They have taken advantage of it, have they not?

(*Mr Hendon*) I cannot deny it. In fact, the Japanese are not calling the shots in this market. We have some very good British companies who are calling the shots in the digital market. I am sure the Japanese will come up quickly behind, but they are certainly not leading the way. I think that cellular telephones are another area where Europe is absolutely leading the way. The Japanese are trying very hard to take a market share—and with free trade agreements why should they not—but the fact is that they will be making what European companies wanted to be made rather than what they chose to be made. I think, my Lord Chairman, that diversity comes from competition.

Lord Dixon-Smith

11. My Lord Chairman, I am not sure whether this is too narrow a question, in a sense, but it is certainly focused to a degree. One of the things which fascinated me from the plethora of evidence which we have had to try to wade though (and I must admit, I have not got through it all yet) was the number of occasions on which I saw that, with the exception of BT and Mercury, investment in the actual network structures in this country had been forced overseas because we had stopped the 100 per cent capital allowances, and the vehicles now doing it were French, American or whatever. Does not that mean inevitably—although I think you have already answered this point in another way—that we are always going to be following the game rather than leading it, because in fact we have thrown away the opportunity to have our own particular industry going at it?

(*Mr MacIntyre*) My Lord Chairman, if I can pick up that question, I think the question of investment in networks is very specific in terms of which companies are actually investing in networks. It is probably fair to say that the United Kingdom across the whole spread of network investment is amongst the world leaders, if not *the* world leader. What I think you have also put your finger on is the fact that a lot of cable companies, apart from BT and Mercury—there are special British companies such as Energis which is another British company, such as Racal which has just taken over the British Rail network business—are in fact foreign owned but they are investing an enormous amount of money in this country in networks. The result will be that by the turn of the century, if the investment plans materialise—which they are well on the way to doing—the United Kingdom consumer will have a choice of which network he or she uses at every level, local, national and international. That will create a very dynamic market in terms of market infrastructure competition. So I am not sure that particularly in the area of network investment there is much evidence to suggest that the United Kingdom is in fact lagging behind. I think that some of the powerful and dynamic forces of competition which have been brought to bear on BT have actually had a pretty dramatic effect on BT itself.

12. I am very happy with that, my Lord Chairman, because I think the less the situation can be controlled the better. The reaction I was seeking to get from the DTI, if you like, was whether they felt the same. I think we have partially had the question answered, but it seems to me that we are pursuing the game rather than leading it.

(*Mr MacIntyre*) John is deeply involved in this market framework issue. My own view is that the United Kingdom is in fact leading the game. There are some important players as well. The Americans are approaching it in a different way, or have approached the whole question of developing the infrastructure and what goes on in the infrastructure in a different way. However, we have focused on creating a framework within which private sector players can compete, and which enables new entrants to have a reasonable chance of getting into that market. In one sense we are not leading the game in the sense that the Government is actually doing investment or public sector bodies are doing the investment, but that is not, I think, pursuing the game. What is happening is that we have created the framework within which commercial players can operate, where through OFTEL it is policed, and through the framework which has been created by the Government through various measures it is actually creating a very dynamic investment in the Superhighway which people will be able to use.

(*Mr Neilson*) In 1994 we commissioned quite a major study which benchmarked the investment in the United Kingdom in networks against the other major competing countries. That was published.

Lord Dixon-Smith *contd.*]

That showed that we were first or second in all the major areas of network investment in terms of what advanced systems were available to users in the United Kingdom. In terms of the figures, BT continue to invest over £2 billion a year in modern communications networks, but because the Government has encouraged investment by competing providers, they are investing just as much in competing networks, so over the last five years since the 1991 White Paper we have actually seen quite a serious increase in investment in modern networks.

Lord Craig of Radley

13. Going back to the original question which is about standardisation for network interoperability, Mr Hendon in his reply concentrated very much on the European Telecommunications Standards Institute. You make mention in your written evidence about the fact that at the international level the main body is the International Telecommunications Union, a United Nations agency. Perhaps you could tell the Committee what your views are about the way in which that union goes about its work, and whether it is going to enhance the interoperability of the networks which, from the customers' point of view, must remain the prime concern?

(*Mr Hendon*) Yes, my Lord Chairman. I think the reason that I emphasise what is happening at the European level is because in many ways the European level is leading what is happening at the international level. Indeed, it is one of the guiding principles of the European Institute—which we call ETSI—that they should support and feed into standardisation at the international level. What we find in practice is that at the international level the whole pace of progress is rather slower, because you are having to take with you all the countries, including developing countries who have no real infrastructure at all in some cases, and they are very suspicious—perhaps understandably—of efforts by developed countries to speed things up and to introduce new technologies, when their basic telephone service is unsatisfactory. So to provide the standards which industry actually needs to make the moves forward into the information society and multi media and so on, then really the International Telecommunications Union is just too slow. We find it both in terms of the lack of interest of the industrial players in the United Kingdom in playing a very strong role there, and even the traditional network operators are investing less of their own resources in the ITU than they used to do.

14. Could you comment on the interoperability standards between, say, North America and the European frameworks?

(*Mr Hendon*) Yes. What tends to happen is that as you go down to the more fundamental standards, then the base of change is slower because the basic infrastructure has to be built and is very expensive to change, it takes a long time. Therefore, those standards are elaborated at the international level, and with regard to changes which are proposed at that very fundamental level—one might use the analogy of a change to the gauge of a railway track, for example, in that such a change would be very long term and very difficult to introduce—it would be rather like that for a fundamental change in telecommunications networks. So what tends to happen is that new ideas are elaborated in Europe, in the United States and, indeed, to an extent in Japan, then at the international level the ideas are brought together so that as the investment starts to roll out it rolls out in a way which does ensure that there is interoperability. Indeed, I think there is no experience of any difficulty of interoperability between Europe and America, for example. Certainly that is my experience.

Lord Hollick

15. I believe that one of the themes which lies behind the question is the issue of access, and in particular having access as widely as possible, as universally as possible and as universally as appropriate. We are all familiar with the problems of conditional access in the satellite business. Do you foresee any problems of access here, and what regulatory steps do we need to take to avoid those problems migrating to the Superhighway?

(*Mr MacIntyre*) First of all, I would agree entirely that access is a crucial question and it was what I was really referring to when I talked about bottleneck control or gateway control and at any stages in any form of network, whether it be a wireline network or a wireless network, there will be particular players who will be able to control a little bit of that process and it is very important that where they can control that, they are prevented from doing it in an anti-competitive way. Now, there are issues about conditional access which are specifically related to the broadcasting area and again where we are very conscious of the concerns. Now, in terms of taking forward the digital, that is of course an issue which is covered within the Broadcasting Bill which is currently before your Lordships' House. What we can do is really talk around the whole issue of conditional access of how we would propose to tackle it in conjunction with OFTEL and I think what I would like to do is ask Mr Neilson to speak on that.

(*Mr Neilson*) I think that it is very significant that conditional access which in the past perhaps has been seen as purely a broadcasting issue, because the Government has recognised that it very much brings together these issues of networks and communications, in fact it has been the DTI that published earlier this month the Government's proposals about conditional access regulations for digital television and it was within this division that we did the work on that, obviously working closely with colleagues in other departments. I think what we are keen to produce in this regulatory framework is something that does not inhibit investment, but nevertheless produces controls where dominance is likely to be a problem in the future, and dominance has to be considered very carefully and OFTEL may well want to talk more about this. When there are emerging markets, when there are no existing players, for example, in digital television, we need to

Lord Hollick *contd.*]

be very careful about defining who is dominant, but yet we need to make clear to potential investors what regime of competition they are likely to face if they do acquire market power in the future and that is what we have attempted to do in the document we published this month.

Baroness Hogg

16. Given the weakness you describe of the global union, what other global international authorities have a locus in this and, most importantly, to what extent are WTO and, I suppose in this context I should say, GATS taking an active interest in standards and interoperability as a potential constraint on competition?

(*Mr MacIntyre*) The focus that we have on the GATS front and in the WTO context is largely about trying to achieve a multilateral agreement about liberalised communications regimes. The UK attaches very considerable importance to that because it then means that you get every country then actually signing up to that level of liberalisation and you avoid some of the very tricky negotiations which inevitably take place when people start to try and put in place bilateral arrangements. Now, on the standards front, I think my understanding is that organisations and mechanisms for actually dealing with standards are largely ITU through into the European standards bodies of the various kinds that there are and interactions with the other bodies in other countries, particularly the Americans and the Japanese. I think this is, as David has said and I think as your Lordships fully recognise, an area where there are inherent in the process some very acute tensions. To give you an example in standards-making of where there is real first-mover advantage in standards-making, if you take the GSM phone, the Europeans got their act together and got an agreed standard quickly. The result was that the manufacturers were able to make to a European standard to meet a European market which is a very large market and the market grew very rapidly and is growing rapidly. The Americans and the Japanese did not actually get their standards together as quickly and the result is that you are starting to see European standards being accepted in other countries which are in neither Europe nor America and in some cases they are actually happening in the United States where people are adopting many of the features of the GSM standards in terms of the networks with mobile phones and the networks that they are actually developing. That is in a way an example of the tension and the importance of actually getting the European act together quickly and that is why we have focused very much on ETSI and how it arrives at standards because we were concerned, as were a lot of the companies that we work very closely with, that standards-making through the ETSI process was too slow and the companies formed a group which was to look at actually how ETSI managed its standards-making and they asked if we would actually provide an official to chair that group which we did, and in fact I had to make available one of my team who is not here today, but who was doing other things, but we focused him on that because it was so important. Now, that group came up with recommendations, as David has said, which are now in the process of being implemented and Mr Hendon is in fact a key member of the group that is actually implementing it, as he has said. If we can make progress in the ETSI area where you are really to a certain extent dealing with mandatory standards and those sorts of issues, one must not underestimate the importance of working through other industry bodies which may often be developing protocols which are not necessarily mandatory, but they are agreements within the industry as to how you should operate systems. That is my perception at a general level. David is deeply involved in every aspect of this, so he can perhaps add another layer of information if you think that would be helpful.

(*Mr Hendon*) Maybe I could just add two very short remarks. One is that there is a GATT procedure where standards which will have regulatory application are available for public enquiry at a worldwide level, so that means that we and everybody else have access to anyone's attempts to create a barrier to trade to stop it happening. The second thing is that all of the standards-making processes which are going on now, including the formal ones and the informal ones, are really based on the principle of openness and the availability of standards to anyone who wants to have them, so again that is very much consistent with the GATT approach to life.

Lord Butterworth

17. I am pleased with what you said about Europe because it seemed to me that the document that you have tendered did not go into this detail and I think you have supplied it today, but in your memorandum you refer to the creation of the Single Market by 1 January 1998, but then there is a very interesting sentence: "Within Europe the Government is particularly keen to encourage the European Commission to ensure that the liberalisation agreed is indeed genuine". I wonder what the force of that adjective is, "genuine". Could you fill me in?

(*Mr MacIntyre*) The European Union has agreed that by 1998 every aspect of the communications industry will be liberalised and that basically the process the European Union has gone through is to focus on, first of all, the services that use networks and then to focus on the networks themselves. By 1998 the objective is that there should be both competition in services, and by "services" I mean everything, everything ranging from data through to voice to closed networks, open networks, everything, and by 1 January 1998 that there is proper competition between networks so that if, for example, a company wishes to set up a service in another European country, that company will be able either to have access to the network of the incumbent operator, because in most of these countries there is only one network, a national network, France Telecom, Deutsche Bundestelecom, they are basically one network with some other networks around, but they are not really part and parcel of the communications infrastructure in the

Lord Butterworth *contd.*]

way in which Mercury, Energis, the cable companies, the mobile phones are part of our communications infrastructure, and what we are concerned about is that there is an almost unlimited potential for companies which have got a dominant position in the markets actually to make it very difficult, if not impossible, for new entrants actually to get into the market either by getting their services on to a network or by building an alternative network. One of the keys to this, we believe, is actually independent regulation such that the dominant operators can be policed properly. Now, we are concerned that in taking forward the process of European liberalisation, which will be based on European Directives which define how people should actually behave, the European Union has the means actually of ensuring that that is properly policed and that the regulation is properly independent. That is what is behind it. We believe, and we have been involved in increasingly liberalised communications markets for over ten years, that, through OFTEL and through our own knowledge, we have a lot of experience of the areas that you need actually to police quite carefully. Lord Hollick mentioned the question of conditional access which is a classic area where one has to watch very carefully how that sort of bottleneck control is actually exercised. I think that an understanding of the importance of regulation in a pro-competitive way is something which we have learned through our own experiences. Very interestingly I think that when I was out in the United States about a year ago and talking with the American Adminstration, there was a lot of debate about creating an environment where the regional operating companies could actually operate on a national level and the key question was actually what level of competition there was for the regional companies and the key there was actually how they were regulated because they have a dominant position in contact and access to the customer and that is a crucial control and it has got to be properly regulated.

Lord Flowers

18. May I move on to public information? Your paper which was exceedingly helpful left me, nevertheless, a bit puzzled about who really was at the centre of things able to co-ordinate the strategy of government or even just influence it. There is the DTI, the CCTA, the Office of Public Service, and the Central IT Unit now, there is HMSO and dozens and dozens of users. Where really is the strategy of government for its own purposes, let us say, expressed?

(*Mr MacIntyre*) You will understand if I have a little difficulty in answering for the whole of government in this area. What I can perhaps explain—

19. Perhaps you can tell us who can then.

(*Mr MacIntyre*) Allow me, my Lord, just to say what I think our role is because I think that that will actually help in understanding the way in which the Government tackles it. The DTI is in a pivotal position in many of these areas because the DTI has had responsibility obviously of reporting to DTI ministers, but has had the responsibility for developing the framework in which communications industries will actually operate so that the regulatory framework, the standards that they operate, the whole question of protocols which we have talked about is fairly and squarely in our area of responsibility, so in one sense we have one big chunk of the jigsaw which is our responsibility. We also have responsibilities for interacting with the industries which actually provide equipment and services to go on the networks so again we have an important interface with another important part of the jigsaw. About just over one year ago we recognised that the UK had a situation where we were developing very high capacity, very sophisticated networks and what we needed to look at as a country was actually how those networks were used. It was a bit like having a highway and not having the vehicles to go down the highway or the things to go in the vehicles. So we felt that we needed to take the initiative, bearing in mind the interactions that we have with a lot of the key players in this, ourselves, so we actually set up the Multimedia Unit and Mr Taylor took responsibility for the Multimedia Industry Advisory Group for the whole of this area which was focusing on content. Now, we recognise that in focusing on content, the Government itself had an important role to play because not only was the Government a major provider of information, it was also a major user of information and, therefore, we needed to make sure that our liaisons with the people who influence that were very close and the ones that come immediately to mind are obviously the CCTA, which has an important role to play in terms of the Government's expertise, its own expertise, the Department for Education, which is the main vehicle of contact with the education community, and the Department of Health, which is another major area of expenditure. Now, we have developed those relationships. I think the most significant or an important new development has been the establishment of the Central IT Unit in the Cabinet Office and the CCTA is also within that network of responsibilities and CCTA is about providing quality advice in terms of the user systems and networks and the CITU is really bringing together, as I understand it, and there has been a Parliamentary Answer to that effect, bringing together the whole question about making sure that the Government use of IT systems is as good as it could be.

20. But that is what CCTA used to do before it moved to Norwich, is it not? Is the effect of putting people out into the periphery to recreate things in the centre?

(*Mr MacIntyre*) I do not think so. I think that the CITU is a relatively small unit which is actually focusing on the Government's strategy towards the use of IT. As I see it, the CCTA is about providing hands-on experience and advice in support of what they do in terms of IT, so I see it that the CITU has a co-ordinating role and the CCTA has an active advisory role.

Baroness Hogg

21. May I jump to intellectual property rights which you rightly describe in your memorandum as very controversial. Could I ask you just to take that a little further forward as to how you see that part of the framework, which is necessarily governmental either at national or at some kind of international co-operative level, developing?

(*Mr MacIntyre*) We see the whole of this area which we believe covers intellectual property rights, in many ways it relates to IT security, it covers both and it also covers effectively copyright too and all the interactions in that area when you come to the publishing, recorded music, broadcasting industries, they are all very important aspects of creating the right framework because they both are means of deterring people from getting into the market and they are means of actually limiting people's freedom to operate, so there are some important areas here. Now, we have focused on one area which is specifically within our area of responsibility which is the question of intellectual property rights with regard to equipment and the way in which that actually bears on the freedom with which people can start to introduce equipment into networks and the way in which networks are used. Mr Hendon has been again deeply involved in this because this is an issue which has caused quite a lot of difficulty within the standards-making bodies about the freedom with which people can have access to intellectual property on fair terms. Nobody is denying that people who own intellectual property should not be allowed to charge for it, but there is another dimension which is that they should not charge a monopoly price, so there is that issue. David, can you pick up on that area?

(*Mr Hendon*) Perhaps I could just say that there has been a lot of debate both within Europe and I think around the world about the problems of embodying new technologies into standards which enable markets to be grown, on the one hand, and then people being able to exploit the fruits of their investment in research and development which has shown up as intellectual property, on the other hand, and when does a competitive edge become a sort of abuse of dominant position. It is a very difficult question and I think there is no black and white answer. There have been some attempts to produce rules in the standardisation world and those attempts have really failed, although there are some ground rules, but the attempts to make it all very simple failed because basically it is not simple, so I think it is something that we need to keep an eye on and indeed at the moment there is within ETSI an intellectual property rights policy which is in the middle of a sort of trial period and it will come up for review in a year or so. I do not quite know where it is going to go, I am afraid.

Lord Haskel

22. My Lord Chairman, this does lead on to the question of actually selling government documents over the Internet. In the paper that we received you spoke about the HMSO looking to improve access to government documents by trading over the Internet and you also said that, "free electronic access could potentially dent revenue streams generated by paper sales of priced publications, with knock-on effects on their budgets". I wondered whether you could enlarge on that and tell us a little bit more about how one would propose trading over the Internet and selling government documents over the Internet. I am particularly interested in this because of course the whole question of the privatisation of HMSO is now on the agenda.

(*Mr MacIntyre*) There is an interesting dilemma that you have put your finger on, as one would expect, in the sense that the Government clearly has an interest in making sure that as much information as possible is actually provided to people who wish to have access to it and I think it is very interesting the way in which the Vice President of the United States' initiative has actually triggered an enormous surge in terms of the Federal Government putting information out and making it available. Having said that, undoubtedly there are resources that are associated with preparing and providing information in a useable form and the question is whether that, as a matter of principle, ought to be paid by the person who is using that information, so there is a dilemma there. You then touched on the whole question about whether the Internet is an adequate vehicle for actually selling information and we are all aware of the comments that are made and know the fact that the Internet has had weaknesses in this area. So this is an area which we are focusing on which is developing where we are working closely with some of the other government agencies. It is actually one of the areas of the Multimedia Unit's activities, so what I would like to do actually is ask Neil to elaborate on what I have said.

(*Mr Worman*) I do not think there is a great deal more to be said. The Government has guidelines on tradeable information which I am sure you are very familiar with. The issue of whether there is a policy objective of making the information available to promote the use of networks and to promote the take-up of electronic information which requires some review of the tradeable information guidelines is of course a point that has been raised and it is a point that has been discussed between departments. What I am told is that the Government is keeping it under review. I do not think I can say more than that.

23. To put it bluntly, how does the Government propose to collect the money for the documents that they are selling over the Internet?

(*Mr Worman*) I do not think documents are currently being sold over the Internet. Information is being made available over the Internet and as a result of that, documents may be purchased, but I do not think there is any machinery for the transaction taking place over the Internet at the moment.

Lord Flowers

24. My Lord Chairman, could I just intervene for a moment? You can buy quite a lot of stuff or arrange for people to send you stuff if you give your credit card number. I have an aversion to giving my credit card number over the Internet, but there are certain things being proposed to make it safer whereby you give your credit card number to a firm which just deals with settling your bills and they know your credit card number and nobody else does. Somebody has got to regulate that sort of thing, it seems to me,

Lord Flowers *contd.*]

but it is a bit difficult if it is an international outfit, is it not?

(*Mr MacIntyre*) First of all, I do not think Mr Worman is actually saying that nothing is sold over the Internet.

25. Sorry, I was raising another question.

(*Mr MacIntyre*) Your point about the security of money payments over the Internet is something which we are very well aware of and very conscious of. We have been doing a certain amount of work in conjunction with the people who are in this business. It ties in quite closely with issues like encryption and so if I can sort of pass it over to Mr Hendon whose responsibility that is, I think we can get a more informed answer.

(*Mr Hendon*) I think, my Lord Chairman, that it is a real problem to know how to regulate the settling of financial transactions across a network which is inherently global and inherently outside the immediate scope of any existing regulator and so perhaps it is tempting to think one leaves it to the market and hopes everything is all right, but of course that is not probably wise and the Government is considering at the moment what we should do in the UK by way of giving advice on this matter. I think that the thing about payment is that that is just one aspect of a whole range of issues that crop up when you try to do business electronically because if you want to make a contract electronically on the Internet or on any other network and then to enforce it, then there are all sorts of things such as, for example, the contract has to stand up in a court, it has to be demonstrated as not having been altered so if the contract is for 100 widgets and you make 100 widgets at so many pounds each, then you should be able to collect your money and the person who gave you the contract should not be able to argue that it was actually for 50 widgets or whatever. In fact for all of these things, both in the enforcement of contracts and for the payment, encryption is required because encryption is really the only way that you can deny somebody the opportunity to change something without knowing about it and there are all manner of different techniques where you can, for example, sign documents electronically or seal them electronically so that if they are opened, it is apparent that they have been opened and so on and there are many sort of obvious analogies with the envelope. There are all sorts of difficulties with using encryption. For example, it is subject to export control in many parts of the world and you have to try to get people to agree what sort of encryption systems are used because it is no good if you are trying to settle a bill with me if we do not agree to the same encryption system because then it will not work, and what you regard as safe I might not regard as safe or what I regard as safe you might not regard as safe. So there are many issues there as well and in many ways solving these sorts of issues at the national level is a bit of a waste of time because companies and indeed people trade on a global basis and all one could do is sort of help to give a bit of a lead or help to sort of add some intellectual weight to the thinking about it. We are involved in discussions at the European Union level because the European Commission has made some proposals about electronic trading using encryption and there have just recently been some moves within OECD to start to agree things at the international level and so I hope that out of these various moves will come, if not regulation, at least a sort of firm guidance which will encourage people to make choices which do not put their businesses at risk.

Chairman] The clock tells us that time is defeating us rather severely, so a short rider by Baroness Hogg.

Baroness Hogg

26. Without in any way wishing to downplay the difficulties here, these are issues which, after all, have been explored with reference to screen-based trading. Lord Flowers' purchase of a document over the Internet is not categorically in that sense different from him buying shares out of Frankfurt, so presumably experience on the settlement systems in screen-based financial trading has been applied to these issues?

(*Mr Hendon*) Yes, there is already a lot of electronic trading going on on electronic networks. The whole banking system works by electronic trading and they have systems which are good. I do not think they are too free with information about when those systems break down because it might invite the attention of people who would seek to make them break down more often, but I believe that they are very robust systems and there is good experience there, but there is a big difference between settlement systems that work between banks where you can count them on one hand or something and settlement systems that apply to people trading at large who may never have had a relationship before. If I go into a shop on my way back to the office, perhaps I never went into that shop before, but we are able to trade in a way that is entirely satisfactory. The global electronic equivalent of that does not exist yet.

Chairman] I am afraid we shall have to draw this session to a close at that point. Since there are a number of rather important questions that we have not addressed orally, can I invite you, Mr MacIntyre, with your colleagues to produce some elaboration in writing of your answers to those questions which are not covered in your paper. Further to that, perhaps I should say that this outcome is perhaps inevitable at the beginnings of this enquiry so that, as we proceed with evidence, I feel sure that we shall be interested in seeing representatives of your Department again and we might at least wish to talk to the Minister towards the end of our investigation. For the moment, thank you very much indeed for that very helpful set of replies to a few of our questions.

Supplementary memorandum by the Department of Trade and Industry

Officials from the Department gave oral evidence to the committee on 30 January 1996, subsequent to the submission of a memorandum of evidence earlier in that month. This additional memorandum is submitted in response to the Chairman's request that the Department provide written answers to a number of questions that the committee was unable to pose in the time available at the oral session.

References in the questions are to the Department's initial memorandum of evidence.

Would you describe the G7 Government On-Line project, jointly co-ordinated with the Treasury Board of Canada and the CCTA (page 6) ?

The G7 projects stemmed from a G7 Ministerial conference on the Information Society held in Brussels in February 1995. The conference agreed (amongst other things) that a number of pilot projects should be taken forward by the G7 countries and the European Commission, with participation open to non-G7 countries. The G7 has no central secretariat or budget, so resources for the pilot projects have therefore to be found by participating countries. All G7 countries are participating in all the projects, of which there are currently 11 in number.

Different countries lead on different projects. The UK leads on two: one is Government On-Line and the other is Global Interoperability for Broadband Networks, which is working to improve the interconnection of countries' research and education networks, in the case of the UK, SuperJANET.

The G7 Government On-Line Project is co-chaired by CCTA and the Treasury Board of Canada. In addition to the G7 member countries and the European Commission, representatives from the Governments of Australia, Finland, Hungary, Ireland, Israel, Malta, South Africa, Sweden and Switzerland also participate.

The project aims to exchange information between Governments on best practice in the provision of on-line services. It has 3 main themes:

- the increased use of electronic messaging for communications within and between Governments and their clients;
- the provision of on-line Government services to the public;
- the development of electronic transactions processing services for more complex transactions.

The management of the Government On-Line Project by the participants seeks to act as an exemplar by maximising the use of electronic communication. Members have agreed to co-operate to ensure that electronic documents and files (encompassing a wide range of formats) can be routinely and successfully exchanged between project participants.

There are 13 sub-projects within the Government On-Line Project:

Information sharing across Government: the principle of Government collecting and storing commonly used information for use across Government departments will be investigated. The sub-project will consider the issues, benefits and problems in doing this. This sub-project is led by the UK.

Delivering Government information electronically: the sub-project will focus on publicising innovative ways of providing Government information electronically to citizens, businesses and other Government customers. The sub-project is led by the UK.

Locating Government information electronically: to stimulate the development of effective mechanisms which will improve the accessibility of Government information for citizens, enterprises and other Government customers. The sub-project is led by the UK.

Electronic procurement: to investigate the application of electronic mechanisms to an increasing amount of the procurement process. This sub-project will be led by the UK.

Directory services: to share information about the development of Government directories with the possibility of developing inter-linked and co-operating directories. X.500 and other directories will be considered. The sub-project is led by Canada.

Single window Government/one-stop shop: this sub-project will focus on the integrated delivery of Government services, identifying where one stop access to Government services is already in its formative stages. The sub-project will address issues that arise from a "single window" (ie, "one stop" or one point of contact) approach. This sub-project is led by the USA.

Kiosks: to exchange information about kiosk projects in participating countries so that best practice can be identified. This sub-project is led by the USA.

Permits and licences: to exchange information about applications which can be categorised as licensing, permission, approval, etc. and develop guidelines. This sub-project is led by Japan.

Charging for services and information: the project will investigate all aspects of charging for Government information and services, including mechanisms for collecting payments. This sub-project is led by the USA.

On-Line support for democracy: all aspects of on-line services to the public in support of the democratic process will be considered, including how the citizen should be able to communicate with Government. This sub-project is led by Sweden.

Compendium of Government on-line activities: a catalogue of initiatives of interest to the Government On-Line project will be developed, complementary to the Global Inventory Project to facilitate information sharing generally. This sub-project is led by Canada.

Distributing knowledge for administrative problem solving: this sub-project will provide a knowledge base of local and regional solutions to common administrative problems. This sub-project will be led by the European Commission.

Provision of information about jobs: to provide information about job markets and living and working conditions with the objective of enhancing labour mobility opportunities. This sub-project is led by the European Commission.

What progress have CCTA and the Benefits Agency made in developing the kiosk system providing access to a range of Government information (page 6) ?

The CCTA will be able to provide full details, but the DTI has made some initial enquiries, which we hope will prove helpful to the Committee.

CCTA developed their multimedia kiosk in collaboration with the Benefits Agency and IBM, designing it originally to provide access to information about State Benefits, eg: in post offices or benefit offices.

The kiosk is touch-screen driven and operates via a series of menus which enable users to search for information about the different types of benefit and eligibility criteria. Further work has been undertaken to extend the range of information carried by the kiosk eg, information about Departments' and Ministers' responsibilities have been added. The kiosk also now provides access to the CCTA Government Information Service (CGIS) on the Internet. This extends to range of information accessible via the kiosk to some 180 Government Departments and public sector organisations.

CCTA have reported that a trial of the Kiosk was completed successfully during 1995 in Bournemouth.

Whilst the DTI's use of electronic mail and the Internet is impressive, who in Government has authority and vision to ensure that all other Government Departments follow suit (pages 10 and 11) ?

The Department is grateful for the Committee's kind words on our progress in making use of the superhighways. The Department indeed finds electronic mail very useful for internal and external communications—especially as so many businesses now using it. E-mail addresses are commonly printed on Departmental business cards. The Internet is also useful as mechanism for acquiring and publishing information. Many other Departments also now using E-mail and Internet.

Looking across Government, the Central IT Unit, established towards the end of last year, is intended to address this kind of question. As announced in December, the CITU will take a strategic view of the way IT is used across Government, seeking to ensure that the opportunities this presents are exploited to maximum effect. The CITU is established within the Office of Public Service, and will report, through the Chancellor of the Duchy of Lancaster, to the Deputy Prime Minister.

The CITU and the Department will work in close co-operation, and the Department's Ministers have welcomed the establishment of the Unit. The Department will seek to ensure that CITU is kept in close touch with relevant developments in the market place and we would expect to play a particular role where issues relevant to our industry sponsorship activities arise.

You state that "the cable industry regard their UK ventures as a test-bed for wider entry into Europe". Is the associated environmental degradation, including the reported destruction of tree roots, part of this testing process and if so, who is evaluating the environmental costs (page 11) ?

With any new technology there is always an associated level of disruption whilst it is being introduced. Before explaining how seriously environmental concerns in relations to cable construction are taken, it may be helpful to explain very briefly the benefits which the introduction of cable networks have brought to this country.

Over £5 billion has been invested in new cable networks. At the current rate, investment will this year be over £2 billion. This represents a substantial level of economic activity and brings with it important consequences for employment in the construction and telecoms industries. All this investment has produced choice for consumers. Over one million homes now watch cable television. In addition, there are now over 1.2 million telephone lines installed by cable operators.

Cable networks have not only directly added to the choice available to consumers, but have also stimulated substantial improvements in BT's efficiency and quality of service, which have been enjoyed by BT's customers all over the country. Competition in the local loop of the sort provided by cable companies, that is with direct access to customers, is now widely recognised as an essential prerequisite to sustainable competition in the long term.

The Government is certainly conscious of the need to avoid any unnecessary disruption caused by telecoms operators being granted powers to dig up the streets in order to construct new networks. All telecommunications operator licences, including those of the cable companies, contain a number of conditions designed to reduce disruption resulting from streetworks activity, and ensure that the visual amenity of properties in the vicinity of telecoms development are protected so far as practical.

The cable operators themselves are keen to avoid any unnecessary disturbance. Over the last two years, all the cable companies have come together to introduce a code of practice which lays down standards of best practice construction. More recently, in April last year, the National Joint Utilities Group introduced guidelines on trenching in the vicinity of trees. These guidelines apply not only to cable companies but to gas, electricity and water utilities. All cable companies are committed to best practice, and recent experience is that their practices are improving. Certainly, letters to the Department complaining about concern for damage to roots have declined significantly in recent months.

The Department monitors carefully any complaints we receive about damage to trees and other environmental issues. In fact, although we are not complacent, there is little direct evidence from this to support claims that cable trenches have caused widespread damage to tree roots.

If local residents do become concerned about the practices of contractors in digging round trees, or about other impacts on their local environment, they should immediately raise these concerns both with the operator and with their local authority. In sensitive cases, best practice in the cable industry involves consulting with local arboriculturalists.

What is the role of radio in the local loop (page 3) ?

The Government's consistent policy has been to promote competition in the provision of telecommunications infrastructure. The Government is also committed to ensuring that modern telecommunications are available as widely as possible across the UK, even in less-densely populated areas. Given the relatively high costs of providing local connections to final customers, competition in such connections has been the slowest in developing.

Radio in the local loop enables operators to offer telecommunications services to their customers via fixed radio links, as an alternative to using conventional fixed copper wire or optical fibre connections. Using radio to connect telecoms services over "the last mile" enables new operators to enter the market at relatively limited cost, and thereby to compete effectively in providing a telecoms service to end users.

BT now faces significant competition from cable operators in the local loop. In the future, we look to radio fixed access operators to provide a further important stimulus to falling prices and improved services for many local customers. The Government has been active in making further spectrum available for radio fixed access services in order to increase competition.

Two operators, Ionica and Liberty, have already been licensed to offer services via fixed radio links at around 3-4 GHz, with Ionica expected to launch its services this year. The Government has also recently announced the outcome of a competition to licence more radio fixed access operators in two further frequency bands. We were particularly pleased with the 24 applications received late last year and with the quality of the companies making them.

Spectrum at 10 GHz has been made available which is particularly suitable for small and medium size businesses requiring digital services. Services at 10 GHz are intended to boost the development of Integrated Services Digital Network (ISDN) in the UK. The operators in the 10 GHz band will offer ISDN access and above at a minimum bit rate over the link of 144 Kbits/sec rising to perhaps 2 Mbits/sec. This is sufficient to meet many advanced IT requirements. However, due to spectrum limitations, it is not expected that such operators will be able to offer the full range of broadband services normally associated with multi-media. These can best be offered over a cable connection. Spectrum in the 2 GHz band has also been found to extend telecommunication services to customers living in certain remote rural areas covering about 40 per cent of the land area of the UK. Three new licences will be awarded to Mercury, Ionica and NTL to offer services in the 10G Hz band and two licences will be awarded to BT and Radiotel to offer services in the 2 GHz band. These licences represent a significant extension of competition in this growing market.

How can the Government, as a significant holder of information and purchaser of communications, help to stimulate multimedia development (page 12) ?

The role for Government in the development of multimedia is primarily one of providing leadership, through the development of best practice, facilitation of market-led developments and leading by example. However, in terms of an increasingly global market, the idea that UK Government demand for the Government's own use can directly lead major market developments is less and less likely to hold true.

The Government can directly stimulate development of multimedia through its role as holder of information. In general, Government is making an increasing proportion of information available electronically, whether freely or at a price. A good example of the possibilities is the material for the new Information Society Initiative. This is available not just by post and fax, but also by E-mail and through the World Wide Web. We hope that making useful information available in this way will encourage businesses to get on-line and become familiar with multi-media formats.

The Department recognises that a balance must be struck between the interests of the information industry, which would seek to add value to published information, and the interests of the public in accessing information, as well as the interests of public policy in recouping the costs of compiling core, specialist information. The Internet is a helpful tool in combining a relatively low usage cost for the accessing of information with a relatively low publishing cost.

The Government can, to some extent, stimulate the market through its procurement, with an annual expenditure of £2 billion on information technology. However, a more widely applicable method of stimulating multimedia development is as an intelligent user and by leading by example—eg, using EDI for procurement itself (notably the MoD) and making procurements which encourage others to make good use of technology. Good examples are the DTI exporting videoconferencing network and the Inland Revenue trials on electronic tax returns. The Government's own procurement should not be seen in isolation, but through its encouragement, for example, of the education and health sectors to take full advantage of superhighway applications, as DfEE and DoH/NHS have been doing.

What are the answers to the problems which you list on the last page of your memorandum (page 18) ?

In general terms, the Department is seeking to ensure that UK based companies are as proactive as possible in creating and exploiting new market applications for the information society. However, as we pointed out in our first memorandum, although software is an important sector, its share of value added in the overall delivery of information superhighway services to the customer is steadily falling. The lion's share of value added comes from content provision. Here, quality and relevance of the information provided is crucial. This is an area in which the UK has particular strengths. However, there are a number of issues which might affect the software sector:

> Responsiveness/Marketing: UK-based companies have developed niche market capabilities, but largely based on the UK market. It will be essential to improve marketing efforts in order to take these products to the global market. Firms should be able to take advantage of DTI's export promotion services to address this issue, and the Information Society Initiative will help to raise awareness of on-line export services.
>
> Take-over by larger US companies: The most appropriate commercial strategy here is likely to be alliances with both US and non-US firms, to provide access to complementary resources, markets and distribution channels. The UK strength in creative and technical development is an attractive resource on which to build such alliances. Strategic alliances of this sort are becoming increasingly important in a range of sectors and are particularly relevant in the converging information and communications sectors because of the strong pressures towards globalisation.
>
> Through means such as these, much of the added value continues to be created in the UK and not transferred to other countries. Overall, the capability of the UK to retain the value added by software development depends on the industrial and regulatory environment in the UK being right. The generally de-regulatory and enterprise-enabling approach of the Government has found favour in this regard.
>
> Domination which stifles creativity: The UK is renowned for its creativity in key convergent areas such as broadcasting, the "written" word and computer-based games. We are also renowned for our

technical lead in software technologies such as speech recognition, virtual reality, neural computing and safety and mission-critical software. Here, improved marketing will help to ensure that this creativity is brought to market, as will appropriate alliances with overseas firms who can provide financial and marketing resources to mutual benefit. As our first memorandum indicated, some of these areas (eg, neural computing and safety and mission-critical systems) are backed by Government initiatives to raise awareness of the business benefits of using this software and to help bring products quickly to market.

Anti-competitive behaviour in the UK market: The Government must be vigilant and use the provisions of UK and EC competition policy to regulate any such behaviour. The existing provisions of general competition law need to be kept under review to ensure they meet the evolving need in these rapidly developing markets.

Letter from the Office of Telecommunications (Oftel)

I am enclosing with this letter the written evidence for this enquiry requested in your letter of 2 January. You will note that the intention is to submit further written evidence, if necessary, following the session planned for 30 January. You will also note that this submission draws liberally on a draft document that we hope to publish around the end of the month (see paragraph 3 of the submission); I am sure the Sub-Committee will realise that until that document is published the section (paragraphs 53-60) of the submission that discusses its contents should remain confidential.

It may be useful if I outline briefly for the Sub-Committee the key messages we see as emerging from the submission:

- OFTEL is not the only regulatory agency to have a remit in this area; in terms of developing advanced applications, our role is essentially one of creating the regulatory framework in which such applications can flourish (paragraphs 6-9);
- the construction of competing interconnecting broadband networks capable of supporting advanced applications is well under way in the UK (paragraphs 10-22);
- the development of the market for advanced applications is as yet unclear and uncertain. While a number of trials are taking place, the transition to commercial service is in most cases still some time away (paragraphs 23-30);
- the way the market for advanced applications will develop can only be conjectural at this stage. It is, however, likely to be a mosaic of independent service providers and network operators, with players having an interest in several market sectors, and involving a complex set of commercial inter-relationships (paragraphs 31-37);
- the time might be right for a review of the scope of the level of universal service provided to certain groups of telecommunication users, and especially schools, to reflect the development of advanced networks and applications. This is something that OFTEL has in hand (paragraphs 38-46); and
- OFTEL is concerned that the telecommunications regulatory regime might not be working in a way that encourages the development of independent service providers. We are currently finalising proposals to suitably modify the regime (paragraphs 53-60).

The Sub-Committee will recognise that as a regulator created by statute my areas of responsibility are strictly defined. I would, however, like to step outside them for a moment in order to suggest to the Sub-Committee a thought that perhaps does not currently figure amongst the questions it has posed. The development of advanced networks—my prime responsibility—is only part of the story; an equally important part will be the development of the skills that are needed to allow both the creation of the advanced applications and their efficient use in ways that will maximise the benefits the UK derives from such networks, in both economic and social terms. I suspect that evolution of the true information age will require greater skills and thus place greater demands on the educational system—and especially the universities and colleges of further education in terms of producing more information technology and telecommunications technicians—than is currently envisaged.

I look forward to meeting the Sub-Committee.

DON CRUICKSHANK
Director General

22 January 1996

Memorandum by the Office of Telecommunications

INTRODUCTION

1. This submission represents an initial response from the Office of Telecommunications (OFTEL) to the Committee's request dated 2 January 1996. In the time available it has not been possible to prepare as full or considered a written submission as OFTEL would normally wish to do. Following the session of the Sub-Committee planned for 30 January, to which the Director General has been invited to give evidence, further written evidence, based on the concerns of the Sub-Committee as they emerge at that session, can be submitted if necessary.

2. The Sub-Committee will be aware that the issues relating to the development of broadband networks and the advanced applications that require them have been considered in a number of different contexts. OFTEL has itself prepared or published the following documents, which are attached to this submission (*not printed*), which the Sub-Committee may find it useful to read:

- OFTEL's initial Memorandum, dated 7 February 1994, to the Trade and Industry Committee Optical Fibre Network inquiry;
- OFTEL's response, dated November 1994, to that Committee's report;
- a consultative document, dated August 1995, "Beyond the Telephone, the Television and the PC" on the regulation of the telecommunication networks that will carry the advanced information services of the future;
- a consultative document, dated December 1995, "Universal Telecommunications Services", which considers the case for including advanced services in the definition of universal service, especially as regards the educational sector (see Chapter 8); and
- an Overview Statement, recently prepared for the National Audit Office, on the background to the role of the Director General, the state of competition in the UK telecommunications market and OFTEL's major areas of work.

3. In addition, we intend to publish a Consultative Document towards the end of this month which will contain OFTEL's proposals for changes to the regulatory regime to encourage the development of the market for services using telecommunication systems. A copy of this document will be sent to the Sub-Committee on its publication. The provisional proposals that it contains are outlined in paragraphs 55–60 below.

4. The Sub-Committee will note that this submission deploys certain of the material contained in these documents for the purposes of outlining the background to the answers to the specific questions posed or in the answers themselves.

5. In this submission, rather than use the term "Information Superhighway", which is widely used to cover a variety of different meanings, we have instead used the term "broadband" to describe telecommunication systems—both wire-based and those using radio—capable of transferring large amounts of information at high speed and the advanced applications that require such systems. We have also addressed issues arising from the development of transitional and intermediate systems and services that will naturally occur as we evolve from the current situation towards a fully switched broadband environment.

OFTEL'S ROLE

6. The Director General of Telecommuncations (the Director General) undertakes the various functions assigned to him by the Telecommuncations Act 1984 within the framework of the statutory duties laid down in section 3 of that Act. Those functions are primarily concerned with the economic regulation of telecommunication systems and the services provided over such systems. Under the Act a "telecommunication system" is defined in a way that covers virtually any system that conveys messages, and OFTEL is thus responsible for regulating the telecommunication systems that convey, for instance broadcast services (ie the NTL and BBC transmission systems) and those run by the cable television operators which offer both telecommunication and broadcasting services.

7. OFTEL has no specific role in the regulation of service content (eg the nature and subject matter of programmes and concerns about taste and decency or impartiality or bias) and—although it has found itself in the past drawn into content issues on Premium Rate Services does not consider it has any locus in relation to content regulation.

8. In the context of the Sub-Committee's enquiry, therefore, OFTEL's key role is that of enabler or facilitator, creating the conditions in the telecommunications market in which advanced applications can flourish. With this in mind, this submission concentrates on those questions posed by the Sub-Committee that seem most relevant to OFTEL's regulatory responsibilities and those that, in OFTEL's view, raise issues of immediate and direct importance, ie questions numbered 1, 3, 4 and 5 in the Call For Evidence dated 19 December 1995. While the submission also responds to questions 2 and 8, OFTEL's views on these topics should not be viewed as necessarily authoritative. The submission does not attempt to answer questions 6 and 7.

9. OFTEL's role and, in particular, its objectives are discussed in more detail in the answer to question 5. The remainder of this submission is devoted to responding to the specific questions posed in the Call for Evidence.

QUESTION 1:

What is the current form of the "Information Superhighway", and how is it developing (i) in the United Kingdom and (ii) worldwide? What specific problems arise from incompatible network standards and why are these incompatibilities arising?

10. Due to the high cost of installing public telecommunication networks, new networks are not constructed as all-pervasive ubiquitous networks all at once. They begin either with limited scope or evolve from other networks. Indeed, because of the significant investment by customers and other service providers in existing networks, an evolutionary approach is often necessary with considerable interworking between new and old networks to maintain ubiquitous access.

11. In its Memorandum to the Trade and Industry Committee as part of the Optical Fibre Grid enquiry, OFTEL took the view that the level of investment in installing the infrastructure in both the main and access networks necessary to support broadband applications was encouraging; see paragraphs 11-21 of that Memorandum.

12. In the two years since that Memorandum the level of investment has continued. The cable companies continue to expand their operations and their installed fibre-based systems now cover over six million homes (27 per cent of the total) and have over one million cable television customers and over one million installed telephony exchange lines. The cable companies themselves estimate the level of investment they are making this year as over £2 billion, or £6 million a day. With the continuation of the franchising process by the Independent Television Commission, such broadband systems can be expected to cover around 80 per cent of the population over the course of the next 10 years. The Sub-Committee will be aware of the recent announcement by BT that it is also continuing to invest heavily in upgrading its infrastructure in the access network, even to the point of installing broadband capability down to local access cabinets, despite its argument that such investment is not supportable in the absence of the freedom to convey broadcast entertainment.

13. Thus the development of advanced broadband networks is proceeding gradually. There are, however, some current systems which have some of the attributes of a fully switched broadband network:

(a) switched broadband networks accessible to limited groups. A good example is BT's Switched Multimegabit Data Service (SMDS) which forms the core of the Universities' SuperJANET network;

(b) non-switched broadband broadcast networks as employed by the cable and satellite companies for television delivery. Cable systems have an inbuilt interactive capability (though this is not widely used at the moment) and, with the addition of a "return path" via traditional narrowband networks, limited forms of interactivity can become possible for satellite-based networks;

(c) the narrowband public telephone network, which can be used to access the Internet and other on-line information networks, making huge amounts of information available. The Internet itself is a switched network (some of it broadband) but service quality can vary by virtue of its lack of structured management; and

(d) the Integrated Services Digital Network (ISDN) which even in its narrowband form can enhance (c) above by increasing the access speed to 64kbit/s. Alternatively the ISDN on its own can provide for wideband (midway between narrowband and broadband) communication between users either at 64kbit/s or multiples thereof up to 1.92Mbit/s. This allows services involving the transmission of fairly detailed still or moving pictures such as video conferencing. The Sub-Committee will be aware that a competiton is currently being held by the Department of Trade and Industry, in consultation with OFTEL, to select a suitable operator to use radio spectrum in the 10GHz band to provide fixed digital services, particularly to small and medium sized businesses. The release of this tranche of spectrum for this purpose is intended to increase competition and boost the development of ISDN applications in the UK.

POLICY ON NETWORK COMPETITION

14. The policy pursued by both Government and OFTEL since the privatisation of BT and, more particularly since the review of the BT-Mercury duopoly in 1991, has been to foster the development of a mosaic of competing interconnecting telecommunication networks runs by different operators in different geographical areas. Only when the market is underpinned by competing, interconnecting infrastructure can it become truly competitive and allow regulation to be progressively drawn back.

15. In pursuing this objective, OFTEL has sought to remove barriers to entry to the market which derive from BT's historical position as a monopoly supplier. In particular, OFTEL has worked to develop fair arrangements and charges for the interconnection of competitors' networks with BT's. The promotion of competition in the access network—operators that own the line from the customer to the exchange—has been particularly important and Government restrictions on BT's ability to broadcast entertainment to the home and on its use of radio to provide connections between the customer and the exchange have been instrumental in encouraging competition in the access market.

16. It is instructive to note that the policy of promoting infrastructure competition, once seen as misguidedly optimistic, is now widely accepted as a key means of delivering benefits both to traditional users of networks and to a new generation of service providers. The Trade and Industry Committee, in its enquiry, started with the objective of assessing "the importance of Britain developing *a national optical fibre network* extending to individual homes and businesses" (paragraph 2 of its report, House of Commons paper 285) but finished with a set of recommendations—accepted as official Opposition policy—aimed at promoting the development of *competing broadband networks.* The Sub-Committee will recall that the European Commission's High Level Group (usually referred to as the Bangemann Group) in its report *"Europe and the Global Information Society"* concluded that the key issue for the emergence of new markets was the need for a new regulatory environment allowing full competition and recommended that Member States accelerate the continuing process of liberalising the telecommunication sector by opening up to competition infrastructure and services still in the monopoly area. Turning to consumers themselves, the findings of research conducted for OFTEL by BMRB International Limited was that those residential customers who had taken the opportunity afforded by the development of competition in the access network and taken supply from a cable PTO were satisfied both with the choice they had made and with the fact that they had such a choice.

NETWORK STANDARDS

17. The development of competing interconnecting networks can lead to problems in terms of network standards and the Sub-Committee is right to raise the issue of incompatible network standards. But while OFTEL recognises that incompatible standards can limit market growth and can have an anti-competitive effect, we are not convinced that these are significant problems at present in the development of broadband networks. This is because the cost of broadband development and deployment is so large and the returns so uncertain that industry participants will recognise the need to adopt emerging global standards in order to ensure both the largest possible market for their products or services and lowest unit cost of production of items like "Set Top Boxes". Equally, it is recognised that consumers will not want a multiplicity of such boxes in their homes.

18. One major initiative is DAVIC—the Digital Audio Visual Council—which is a global consensus forming group on the kind of standards needed for future switched broadband interactive services. Most key players—and OFTEL—are members of DAVIC. The group is working very quickly to produce standards for the various interfaces between networks, customer equipment, and information servers and the necessary interoperability between them. When considering the various network standards, it is important to recognise that there are two situations in which differing standards are to be expected or encouraged. Firstly, services can be delivered over a number of different physical media, eg fibre, coaxial cable, copper pairs or radio. Fibre in combination with coaxial cable, copper pairs or radio in the final delivery "drop" is a very likely scenario. Clearly at this level, different standards will be required for different media, but this does not mean that transport services across these systems cannot work to the same standards. Thus interoperability is achieved.

19. Secondly, at an even "higher level" in the hierarchy of standards, some differentiation in the standards to be expected and encouraged in an environment of competing service providers. It is possible that this differentiation could co-exist with standard Set Top Boxes by the box down-loading the application software from the network.

20. OFTEL's view, therefore, is that as long as network operators deploy emerging global standards to produce open transparent networks, then there is no need to regulate which standards are used. We would have concerns, however, if one or more dominant operators were to adopt their own proprietory standards, so rendering the present standards making process redundant.

21. One area of present concern arises from the belief of many that the fully switched broadband network will not be economically viable for many years to come and that most broadband initiatives in the short or medium term will focus on upgrading the various broadcast broadband systems as they convert to digital technology and add element of interactivity. In such unswitched networks, the overriding requirement for interoperability with peer networks is absent. This means that the various competing television network types (cable, satellite and terrestrial transmission) may adopt differing standards, which could alter both the scale economies and consumer benefits of a more universal "Set Top Box". We are aware of several industry initiatives which seek to address Set Top Box development for parts of the broadcasting industry, with the risk that customers will need to purchase more than one Set Top Box if they wish to receive the programmes of more than one network. OFTEL intends to seek the views of the industry on gaining greater co-operation

on standards development in this area. While OFTEL has some limited powers to enforce uniform standards at interfaces between public telecommunication networks, it does not presently have similar powers at the interface between networks and customers. In July last year OFTEL published a consultative document, *"The Customer Interface to Public Networks"*, on whether the voluntary standardisation process at such interfaces was working appropriately or whether we should have powers to intervene where the public interest demanded uniformity of standards for important basic services.

22. OFTEL has no present powers in relation to satellite or terrestrial television standards, although the Government's White Paper, "Digital Terrestrial Broadcasting" (Cm 2946), published in August last year, has suggested that OFTEL should regulate Conditional Access systems for future digital television systems.

QUESTION 2:

What services are being provided, and should be developed/will be required, within for example the following areas; (i) public information, (ii) commerce, (iii) finance, (iv) education, (v) industrial training, (vi) health, (vii) social services, and (viii) entertainment?

23. As this submission explains—see para 6—OFTEL's role is primarily in the regulation of telecommunication networks. As far as services using those networks are concerned some, such as voice telephony, clearly fall to be regulated by OFTEL using its powers under the Telecommunications Act. Others, such as broadcast entertainment services, fall to be regulated by other bodies under different legislation. OFTEL is thus not in a position to provide a comprehensive list of services being provided over telecommunication networks in the areas specified by the Sub-Committee.

24. The Sub-Committee will be aware of a report published in May 1995 by the Parliamentary Office of Science and Technology, "Information 'Superhighways': the UK National Information Infrastructure", which contains at section 3.1 a useful overview of current and planned applications of advanced infrastructure.

25. The Sub-Committee will also be aware of the role of the Internet in providing services via telecommunication networks. Although predominantly used for electronic mail and the transmission of data files, it has an interactive capability that is being exploited in a number of areas, especially in the US with the development of electronic shopping malls and the provision of information on Government. Developments are in hand to provide video-conferencing facilities. Internet connections are growing rapidly, as a result of increasingly wide connectivity and growing access to a wealth of information databases. But text and static colour images—rather than moving images—form the basis of most Internet transactions. Even for these images, reception can be slow for the many users connected via an analogue telephone line and a modem.

26. From its regulatory activities OFTEL is, of course, aware of a number of planned innovative uses of telecommunications networks to provide advanced services:

— BT is trialling the provision of interactive "on demand" services in both its Westminster broadband cable franchise and in the Ipswich and Colchester areas. In addition, BT is starting two new trials this month offering on-line services. The first—one of the pilot projects forming part of the Department of Education and Employment's "Superhighways for Education" initiative—is based in Bristol and called "Education On Line". It offers an enhancement of BT's existing Campus World service, making educational resources available on-line from an ICL server. The second is a premium rate service, called "Wireplay" that allows personal computer game players to interact with each other via the public network; and

— a number of cable PTOs are currently trialling, or planning to trial, the provision of advanced services over their networks. A list of these projects, taken from a paper submitted to OFTEL by the Cable Communications Association, is attached as Annex A.

27. It should, however, be recognised that while there are a number of these trials currently intended or actually under way, many of them are designed to test the technology being used as much as the commercial viability of the service being offered.

28. Turning to the latter half of the question and the services that need to be developed for the future, it is the case that the market demand for innovative and interactive services is as yet uncertain. The delivery to the *home* of entertainment services is the major proven market, with revenues running at over £5 billion a year. This market is, however, currently well-served by existing services: the four terrestial television channels, direct satellite to the home, cable television, and the video sales and rental sectors. The experience so far of those trials that have attempted to build on the entertainment market to offer innovative and interactive sservices, such as those in Rochester, New York, and the Castro Valley, California, has been that the market is not yet ready to support the fully scale development of the broadband networks needed to provide such services. Certainly, no "killer" application has yet emerged to kick-start the market. In many cases, the delivery via telecommunications of an interactive service such as video-on-demand simply substitutes one delivery mechanism—which may have no price advantage—for another that already exists.

29. The available evidence would suggest that given the likely costs involved and the generally limited resources and information needs of residential customers, advanced broadband services might well be aimed primarily at the *business* market, in the early stages at least. The needs of business for the rapid transfer of large amounts information are well recognised. Some sectors, such as financial services and the travel industry, already make widespread use of on-line sources of data while the growing availability of broadband networks will allow large, dispersed, companies to transfer more data more quickly.

30. A further factor to be borne in mind is that four of the eight areas identified by the Sub-Committee in this question are predominantly reliant for funding on the public purse. The development in these areas of advanced broadband services is thus likely to be dependent on initiatives such as the DfEE "Superhighways of Education" projects and while, in the longer term, the use of innnovative applications is likely to lead to improvements in the economy and effectiveness of the delivery of public services, in the short term it might give rise to additional expenditure.

QUESTION 3:

Who will supply these services to consumers in the United Kingdom? How can the participating companies be categorised and what is the nature of the commercial relationships between them? How are suppliers likely to develop? What service standards exist and are they likely to evolve?

31. In attempting to assess how the market for the delivery of broadband services via telecommunication systems might develop, OFTEL has, purely for the purposes of analysis, adopted a model that predicates four very broad market segments:

(a) *Content creation*: for example, film studios, television programme makers, database creators, information providers, games writers, publishers, advertisers. This group will use new modes of delivery to expand the market and develop new services. Content is critical to the development of the market for new services, though its regulation is not a matter for OFTEL. We would, however, have a legitimate concern if the control of content was used to distort competition in networks;

(b) Service provision: on the most difficult segment to define, comprising companies carrying out a wide range of activities. See paragraph 33 below.

(c) *Distribution networks*: such as traditional telecommunication networks (both wire- and radio-based), terrestrial and satellite broadcast networks, and other wire-relay systems as well as other forms of distribution, such as printing and publishing and CD-ROM. On one level, a distribution network can be regarded simply as the "pipe" that conveys the message. Its function is nevertheless crucial to the whole and central to OFTEL's interest in these issues: and

(d) *Consumer equipment*: such as personal computers, television sets, set top convertors, video recorders, modems. Some elements of this market are already well developed, for example, the personal computer market. Others are less well so, such as the intelligence linking customer apparatus to the distribution network, through set top convertors, modems and conditional access systems. As customers may be understandably reluctant to purchase such equipment before services are well developed, service providers and network owners may have to play a part in supplying apparatus.

32. This is, of course, an over-simplification of what will probably be a series of complex interactions between a large number of market players, many of which will want to participate in more than one of the market segments identified.

33. Focusing on service providers, the essential activity in this market segment is the packaging and presentation of services, perhaps from a variety of sources, to the customer. Looking at the current telecommunications world, one can identify the following spread of activity involving service providers and their use of networks, ranging from traditional narrowband applications to more advanced applications that require a broadband capability:

- network connection services, ie the basic building blocks of a telecommunications network—signal transmission and switching, plus the additional apparatus and services to make a telecommunication system work. Only network operators can realistically provide these economically;
- basic retail services such as voice telephony or telex. These comprise network connection services, plus retail elements such as sales and marketing, billing and customer service; and
- enhanced or value-added retail services. These include all telecommunication services other than basic retail services and contain some additional element over and above basic retail services, which in most cases is readily capable of being supplied by independent service providers (ie those that do not own a network). Examples of enhanced services are: electronic mail, on-line information services, video conferencing, Internet access, virtual private networks, premium rate services, calling card services, personal numbering, telemetry, enhanced facsimile, electronic data interchange, business television, broadband switched mass-market services.

34. Turning to the issue of who will be providing advanced services via broadband networks and the nature of the commercial relationships between the various players, it is likely that there will develop a rich pattern of different types of service provider, some of which will be network operators in their own right, some of which will run their own telecommunication apparatus connected directly to distribution networks, or use others' apparatus. Some may control their own gateways and control systems; others may depend on those of third parties. Some may collect bills, recruit advertisers, and run navigation systems. Equally, these functions may be carried out by network owners.

35. It is more than likely that any individual player will wish to participate in more than one market segment, and in particular that network operators themselves will wish to migrate up the value chain into enhanced service provision in order to maximise the return on the considerable investment being made—uniquely by the traditional PTOs—in the installation of broadband networks. This scenario gives rise to two related problems: how far network operators should be obligated to grant networks to competing service providers; and how far those with market power in a related market might be allowed to leverage that power into its provision of services to customers.

36. These issues—together with some thoughts on how the commercial relationships between network operators and service providers are likely to develop—are covered in some detail, in the context of the development of fully-switched broadband networks in the OFTEL Consultative Document "Beyond the Telephone, the Television and the PC". Broadly, OFTEL's approach is to balance the incentives for network operators to continue to invest in broadband networks without stifling the scope for independent service providers to enter the market and to prevent those network operators that have achieved a position of market dominance from abusing it, either in relation to other, competing service providers or in relation to consumers.

37. More immediately, OFTEL has been considering the issue of the terms on which access to networks is currently granted by BT as the dominant network operator to independent service providers, although the principles at issue could apply equally to the broadband as to the narrowband environment. This is discussed further in the answer to question 5 below.

Question 4:

How can universal access to services provided for the common good be secured within a commercially competitive market framework?

38. The Director General has a statutory duty to ensure that telecommunication *services* are provided throughout the UK to meet all reasonable demands for them. This, together with OFTEL's role in ensuring licensees comply with service provision obligations, has led OFTEL to initiate a debate on the level of universal service that will be appropriate in the future. As this debate raises social and economic issues that go well beyond the Director General's responsibilities this is being pursued in concert with Government generally.

39. OFTEL is keen to ensure that, once they become more widely available, new broadband services can be accessed on affordable terms by as many consumers as possible, including those in rural or remote areas and those with special needs. One way in which they could be made more widely accessible and affordable, when this becomes appropriate, could be by means of an upgraded level of universal service requirement.

40. Over the years, the concept of a universal telecommunication service has grown in line with improving technology and falling costs. BT's current obligation is to provide basic voice telephony and certain other established telecommunication services at a common tariff to anyone in the UK who reasonably requests them. Apart from the similar service obligation imposed on Kingston Communications in Hull, the service obligations in other telecommunications licences have generally been set at lower levels. The question is whether and when the concept of a universal service should be further extended to the new services and, if so, to what services.

41. OFTEL has recently published a consultative document, "Universal Telecommunications Services", which outlines a set of proposals for securing and delivering a flexible framework for universal service for telecommunications across the UK, both now and in the future, in a competitive marketplace. This document addresses both the issue of the definition of universal service as we move towards the 21st century and whether the universal service framework should be used to provide higher levels of services to certain groups of customers in order to meet specific economic or social goals.

42. On the definition of universal service, the proposal is that it should be broadened to take account of the principle that a different level of service may apply to different groups of customers. An approach is proposed that sees universal service defined along the following lines: "affordable access to basic telecommunication services for all those reasonably requesting it regardless of where they live". The level of service defined as "basic" telecommunication services would depend on the customer class or group under consideration. Geographic averaging of tariffs would apply to all levels of telecommunication service as

defined for universal service purposes. Network operators would be required to offer, or contribute to the cost of, the same service on the same terms to the same "class" of customers throughout the UK for any defined universal service level.

43. This approach implies the need to develop firm definitions of the basic telecommunication service level for universal service purposes for several different customer groups. These include all UK consumers, those with serious communication difficulties and, most pertinently for the purposes of this submission, discrete classes of customer that might receive a higher level of universal service.

44. There are a number of potential contenders for consideration as an appropriate class of customer. These include public access points such as public libraries, community centres, or job centres; hospitals, clinics, and GPs' surgeries; and educational establishments such as schools and colleges.

45. OFTEL believes that any development of universal service arrangements should focus on priorities, at least for the period from 1997, and be contained by reasonable bounds in terms of any additional cost to the industry. A number of commentators have suggested that education should be the top priority for action, in order to skill and equip young people for the "information age" and to use the power of IT to enhance their education generally. Arguably the first priority for the UK, because of the number of institutions involved and the way in which schools are funded, should be to support the delivery of effective education services for school age children.

46. OFTEL is currently consulting widely on whether universal service arrangements in the UK should be extended in this way.

The "basic telecommunication service" definition could vary by type of school, but OFTEL would expect it to include, as a basic minimum entitlement:

- reasonably affordable access to a wideband or broadband network;
- reasonably affordable and predictable network access and usage charges; and
- dedicated external high speed network links.

More detail on these proposals is contained in Chapter 8 of the "Universal Telecommunications Services" document.

QUESTION 5:

What is the role of central Government in connection with the "Information Superhighway" service provision, including the following areas: (i) leadership; (ii) promoting inward investment; (iii) promoting and safeguarding the interests of UK firms worldwide; (iv) promoting network compatibility; (v) access to Government information; (vi) security of payment; (vii) data protection, confidentiality and censorship; (viii) verification of information; and (ix) promoting the development of UK-orientated software?

47. It is proposed to answer this question in terms of the role OFTEL considers it has in connection with the delivery of broadband services as the statutory regulator for the telecommunications sector.

48. This submission has already referred to the statutory duties imposed on the Director General by section 3 of the Telecommunications Act 1984. Some of these—such as the duty to promote research into and the development and use of new techniques by telecommunications operators—go wider than the nine areas identified in the question, though equally some of the nine areas, such as censorship, go well beyond the Director General's responsibilities.

49. Addressing each of the nine areas in turn, from OFTEL's perspective:

(i) leadership: OFTEL has taken a number of initiatives aimed at encouraging the development of broadband networks and services. The Consultative Document "Beyond the Telephone, the Television and the PC" represented an attempt to open the debate on a series of key practical regulatory issues arising from such development. It drew wide and carefully-considered comments which are currently being assessed. A further statement on the way forward following the Document is being considered. The Consultative Document "Universal Telecommunications Services" specifically addressed the issue of whether broadband services should form part of the universal service applicable to certain groups of customers and OFTEL is hosting a workshop to discuss its proposals in this regard towards the end of next month. OFTEL expects to continue to take such initiatives;

(ii) promoting inward investment: although OFTEL's areas of responsibility do not include the direct promotion of inward investment, the policies it has pursued towards the creation of a competitive market in the UK for infrastructure and services has led directly to significant inward flows of investment. The cable companies will, for instance, have invested over £7 billion in the UK by the end of this year, creating an industry that has grown from virtually zero in 1990 to one employing over 30,000. A similar sum will be required to complete its planned construction activity. Investment to fund the development of the cable sector is coming from the US, Canada, France, the

Netherlands and Singapore as well as the UK. In addition, equipment manufacturers such as Nokia and Nortel are creating a presence in the UK in order to take advantage of the opportunities offered;

(iii) promoting and safeguarding the interests of UK firms worldwide: the Director General has a statutory duty to exercise his powers and functions in such way as to enable those providing telecommunication services and apparatus in the UK to compete effectively in their provision outside the UK. OFTEL achieves this objective in two ways: by acting to create a fully competitive market in the UK, and thus making UK firms more able to compete effectively abroad; and by actively promoting the liberalisation of overseas markets through relationships with the appropriate regulatory agencies in other countries, such as the FCC in the USA, via the European Commission, and via participation together with DTI in GATS/WTO negotiations;

(iv) promoting network compatibility: the response to question 1 covers some of OFTEL's work under this heading. The Sub-Committee may also be interested to learn that following the 1991 White Paper *"Competition and Choice: Telecommunications Policy for the 1990s"*, which recognised that a competitive market in both network services and the market for customer premises equipment might lead to a situation where multiple standards emerge for the interfaces between networks with an undesirable effect on the development or competition and on consumers, the Network Interoperability Consultative Committee (NICC) was created. The NICC's role is to advise the Director General on new and emerging or changed interfaces and on which interfaces should be harmonised. It also stimulates, where necessary, the production of standards. Its work programme currently concentrates on interface standards for narrowband applications, but it may well, in the future, need to shift its focus on to standard for broadband applications; and

(v)-(ix) OFTEL has no specific responsibility in relation to these areas, though the Sub-Committee will note that some issues relating to security of payment and to confidentiality and censorship are covered to an extent by Chapters 4 and 5 of the "Beyond the Telephone, the Television and the PC" Consultative Document.

50. Looking beyond these particular, defined areas, OFTEL's overall goal is to seek the best possible deal for the consumer in terms of quality, choice and value for money. This objective is not concerned solely with price but also with providing choice and improving quality of service. A fully competitive market will deliver all of these things; competition drives down prices, acts as a spur to innovation and automatically provides choice.

51. OFTEL therefore addresses its overall goal through objectives aimed at promoting effective competition in the telecommunications industry and, in parallel, protecting consumers where effective competition has yet to develop. The objectives OFTEL has set itself for this work are:

— *Promoting network competition:* encouraging the development of competing, interconnecting networks so that there is a choice of operators providing either retail services to customers or wholesale services to other operators. The promotion of competition amongst operators offering services direct to residential customers is a priority;

— *promoting service competition:* OFTEL wants to ensure that the regulatory framework encourages the expansion of the number of players offering an increasing variety of retail services to consumers;

— *ensuring fair trading:* competition can only flourish if the market is fair. The Director General must have effective powers to deter anti-competitive practices and to take firm and prompt action to deal with anti-competitive practices and prevent the abuse of market dominance;

— *the distribution of benefits:* competition should bring benefits to all consumers and not just those with market power. Residential consumers and businesses should get fair shares of these benefits. The needs of the elderly, people with disabilities and those who have difficulty affording basic telephony services should also be properly addressed; and

— *consumer protection:* consumers want to have real choice, to have clear information about prices and services, and they want to know that, in a market where competition is not yet fully effective, they are paying fair prices.

52. In the context of the Sub-Committee's enquiry, two of these objectives merit particular attention. The aim of *promoting network competition* was discussed in the answer to question 1. OFTEL's policies and proposals in relation to *promoting service competition* are dealt with in paragraphs 55-60 below.

53. Turning to OFTEL's activity specifically designed to promote the development of new services, earlier consultative documents have sought views on whether the regulatory regime needs adjustment to encourage the development of the market in telecommunication services over fixed networks, and especially of *independent* service providers. OFTEL's concern is to ensure that the right regulatory framework exists for those who want to provide services over other networks rather than build networks themselves.

54. OFTEL believes that the best way to encourage a wider range and diversity of services for the consumer is to encourage more effective competition between *service* providers supplying this market. However, this must be seen against the background of OFTEL's continued commitment to the development of competition between *network* providers. Although competition between service providers can deliver increased choice for

consumers, this is not a complete substitute for competition between networks. Only competition between networks can deliver competition in the supply of the basic network services that are a necessary input into telecommunication services for consumers. Without network competition, vigorous competition between service providers could well be hampered by the inefficient and expensive provision of these basic network services.

55. OFTEL will shortly be issuing a further Consultative Document addressing some of the problems facing service providers caused by the present regulatory regime. It will deal with the question of the tariffs available to service providers for the use of basic network services or "network connection services" supplied by BT. Network connection services—the basic transmission and switching services which can only ultimately be provided by network operators—are an essential input to retail telecommunication services, whether basic services such as voice telephony and telex, or "enhanced" services such as personal numbering and audio and video-conferencing.

56. The Document will focus primarily on BT as a network provider because of its position of dominance in the market for network connection services. In principle, though, the proposals could apply to any network operator in a similar market position.

57. BT is currently required to offer network connection services to other network operators at cost-oriented tariffs and must supply them at the same prices to the part of its own business that provides basic retail services (eg voice telephony). The Consultative Document "Pricing of telecommunications services from 1997" proposes that OFTEL should play a less intrusive role in the setting of these tariffs to other network operators, relying instead upon a "network price cap" to control them similar to the retail price cap that presently exists.

58. Most independent service providers (ie those that do not own a network) that provide "enhanced" services obtain network connection services in the form of a basic retail service package at the same retail tariffs that BT charges to final users. This is because BT is closely controlled in the way in which it may discriminate between different customers. BT must also supply network connection services in the basic retail service package to the part of its business that provides "enhanced" services at the same retail tariffs. OFTEL believes that this lack of flexibility in the terms on which BT can supply these services to independent service providers relative to final users may be holding back the development of the market for "enhanced services". The Consultative Document will therefore propose allowing BT greater freedom to reduce tariffs to independent service providers. It will also consider whether BT should be allowed to discriminate between different types of independent service providers according to the varying market circumstances they may face. However, it is important that a differential is maintained between the tariffs offered by BT to other network operators and to independent service providers. If independent service providers that are not building networks could obtain the same tariffs as operators that are building networks, this would diminish the incentive to build alternative competing infrastructure which is a fundamental objective of OFTEL policy.

59. The Consultative Document will also propose a new classification of basic retail services and "enhanced" services (see the categorisation at paragraph 33). This issue is critical because, as stated earlier, different pricing arrangements apply to BT for network connection services according to whether they are used as inputs to basic retail services or enhanced services. It is particularly important that independent service providers are able to obtain BT's network connection services on the same basis as BT's own "enhanced" service provider business, otherwise they will not be competing on a level playing field. Because of the significant advances in technology used in networks, and the range of services now available, the existing relevant licence definitions are no longer workable. A new classification will help underpin the rules intended to ensure that BT does not gain an unfair advantage over its competitors by virtue of its dominant position in network infrastructure.

60. In the coming months OFTEL will be considering and consulting on further issues which could be disadvantaging independent service providers, for example technical issues concerning access to networks, numbering issues and equipment approvals. OFTEL will also be looking at the advantages enjoyed by BT over independent service providers flowing from its vertical integration and the ubiquity of its network.

QUESTION 8:

Is the dominance of mass-market US software a threat or an opportunity? What hard commercial initiatives can be made (as opposed to "collaborative" ventures such as RACE and ESPRIT) to respond to this dominance?

61. The Sub-Committee will realise that this is not an area for which OFTEL is responsible nor one in which it has special expertise. This submission therefore wishes to make only few brief points on this question. First, that some US software companies are in fact active in the UK and that a US brand name does not necessarily mean that a product contains no UK intellectual or other content; secondly, that the UK's well known expertise in the creative arts, its skills in software creation and the widespread use of English as the *lingua franca* of the information technology world should enable UK firms to offer competing products; and thirdly that if the particular application allow UK commerce to operate more effectively and become more competitive, the fact that it originates in the US, or elsewhere, is of secondary importance.

62. As well as the market for mass-application software, which though important is of relatively low added-value on unit by unit basis, the Sub-Committee may also like to address the market for specialised telecommunications software. Such applications embrace the complex and vital software embedded in telecommunication networks, such as switching, billing and management systems and even mobile telephony handsets. It is recognised that in these areas, the UK industry is a world class player.

Office of Telecommunications

January 1996

ANNEX A

LIST OF TRIALS OF ADVANCED SERVICES PLANNED OR UNDER WAY —PROVIDED BY CABLE OPERATORS

Individual operators' projects include:

Bell Cablemedia: In addition to the joint on-demand TV trial with NYNEX and Telewest (see below BNT), the company is currently undertaking a home banking trial in Peterborough in conjunction with a local building society. The trial with 100 customers, launched in October 1995 is currently being evaluated for a possible full scale launch during 1996. The Company has also launched an Internet access trial for a group of schools in the Redbridge area of East London.

BNT: Three of the largest cable operators, Bell Cablemedia, NYNEX and Telewest are currently launching a trial of On-Demand TV services. It aims to develop joint cable industry standards for the interoperability of services across networks and encourage the developments of content from programmers and other suppliers of software. A "Media Lab" is currently being created at the corporate headquarters of NYNEX where end to end delivery will be tested in a controlled environment. This will be followed by a roll-out to a limited number of customers (about 200) in three separate franchise areas. A full market trial for 2,000 customers is planned in 1997.

CableTel: The company has recently launched its own Internet Access service—Cable Online. The company plans 70 points of presence across the UK by the middle of 1996, providing local access to the Internet for 90 per cent of the population. CableTel have also been awarded the contract to provide a high speed fibre link to seven universities in South Wales under the SuperJanet project.

Cambridge Cable: A full on-demand service is currently being tested in conjunction with a consortium of five companies and is using ATM technology to deliver educational software, Video on Demand, home shopping/banking, computer games and music services to 100 homes and 10 schools. Content partners include NatWest, the Post Office, Tesco, ITN and Anglia TV. The project also includes "programming" provided by local schools and is planned to expand to cover local community information.

Eurobell: The company is currently developing a trial of Microwave Video Distribution Services (MVDS) in the West Kent area, an important technology in delivering multimedia to rural areas using radio services.

General Cable: In Yorkshire, the operator is currently cabling 250 schools in Bradford providing modern links for the local LEA in addition to other cable TV services. The company is also planning to undertake technical evaluations of cable modems providing high-speed broadband access to the Internet. In the Windsor and Middlesex franchises the operator is involved in a technical trial of the cable modem technology with Brunel University; for home working purposes, some teachers are provided with two-way high-speed links between their homes and the University's computers via the coaxial CATV network. It is also running a trial of the business information product, "Tenfore". It also offers Internet for the residential market through a local provider called Vossnet.

NYNEX: In addition to the BNT trial (see above) the company is also working with local authority partners, local universities, health service and police in Salford in Project Gemesis 2000. This wide-scale trial is designed to stimulate public service and community applications for multimedia technology and will use the NYNEX network as the key infrastructure to deliver these services. Over the next five years Gemesis 2000 will develop and implement a range of projects across five key areas: business development; crime prevention; education, training and research; community; and health care. Project teams have been gathered together to include groups of users and practitioners supported by specialists from the University, NYNEX and the City of Salford.

In its Bromley franchise, NYNEX has announced the launch of the NYNEX Multimedia suite. This is a unique and exciting new venture for Bromley, brought about through a public and private sector collaboration. A sponsorship arrangement between NYNEX CableComms and The Studio has made possible the opening of a purpose-built multimedia facility designed for the public to get to grips with the new world of electronic media. The centre will provide courses and classes utilising state-of-the-art multimedia applications. These will include 2-D and 3-D computer graphics and animation, digital imaging, music composition, computerised video editing as well as the ability to bring all these elements together. £35,000 sponsorship by NYNEX CableComms has been matched by a further £35,000 from the Department of National Heritage's Arts Sponsorship Scheme (the "Pairing Scheme"), creating a £70,000 facility. The project has also been supported by SOLOTEC (the South London Training and Enterprise Council) for its potential to create and enhance skills in a sunrise industry and to boost employment prospects for local residents.

Telewest: The company is currently investing in and developing new media products for both the television and PC. These include Pay Per View technology in a number of franchise locations, Digital Broadcasting trials, planned for the second quarter of 1996, On-Demand TV services (see BNT trial above), and internet access services. Internet activity includes narrowband service trials over the PSTN in Edinburgh designed to test the company's ability to deliver such a service on a commercial basis and implement the necessary technical support. The company has also begun trials of Broadband Internet access which will be extended during 1996. Such a service, run over the broadband network and using a TV channel to deliver this service, will offer much higher data rates for users. In the educational field, Telewest are working with Research Machines (the biggest supplier of IT equipment to schools) to develop broadband services to schools (about 100 times faster than current ISDN rates). Current applications include Internet Access, a digital library (via remote access of CD-Roms) and secure file transfer between schools. Currently three schools are linked (about 100 PCs) with plans to extend the network into teachers' and students' homes.

Telecential: The company is currently taking part in the Reading Learning Network, a Government sponsored project linking schools together and pupils' homes. Partners include local authorities, Microsoft and ICL.

Videotron: Videotron have pioneered interactive services through their Videoway service, available to the majority of their customers. This interactive set-top box is capable of delivering interactive television (such as selecting from multiple programme streams of sports, comedy and news shows), computer games, and a huge variety of interactive information services, TV and cinema listings (including quizzes, commercial and educational material). Videotron has also developed a business information service which combines real-time equities, commodities, derivatives and currency prices from around the world, several newswires and 11 business-orientated TV channels, on a common window-based PC platform. This is now being introduced throughout the company's London franchises. Other Videotron initiatives include very high bandwidth services using ATM links to a number of local authorities and to three teaching hospitals in West London, allowing telemedicine applications to be developed.

Examination of Witnesses

Mr D Cruickshank, Director General, Mrs A Walker, Deputy Director General, and Mr P Walker, Technical Director, OFTEL, called in and examined.

Chairman

27. Welcome, Mr Cruickshank. You have heard some part of our session with the DTI and you will recognise that we have a great deal to talk about in this enquiry and it is very good of you to come to our first session. I doubt whether we shall cover all of our interesting questions with you in this opening session of the Committee's investigation either, but thank you for coming. Perhaps you would like to begin by introducing your colleagues and then making whatever preliminary statement you feel desirable.

(*Mr Cruickshank*) Thank you very much, my Lord Chairman. On my right is Mrs Walker who is my deputy and on my left, not related, is Mr Walker who is my Technical Director. They are two of the senior team of eight people who, alongside me, do whatever wise things come out of OFTEL. Just literally a minute of introduction and then over to your good selves. What I am going to say runs a little counter to the direction of the debate I heard you having with the DTI because my view is that the UK is leading the world in liberalisation, particularly in infrastructure competition, competing networks; that the investment in networks is being made at a rate which exceeds almost anywhere else and arguably the United States as well, that the benefits are being delivered; and, most interestingly, that the rest of the world is now following what some years ago was thought to be a rather eccentric UK approach. I am not suggesting that we have solved all the problems on the standards front, on the end-to-end connectivity front, but it seems to me, with regard to network competition and that aspect of our work, that we have scoped the problems, we know what they are, we are tackling them and to the extent there are standards and interconnection issues outstanding, they are not because engineers cannot solve them, but because accountants and business managers cannot come to agreements. And that is where my role trips in. So from our perspective, we see the problem as: how is the UK going to keep that edge? And that means focusing on services, what the services are that our society both at home and at work is going to need; who is going to provide them; what problems are they now facing or do they anticipate having to tackle; and how do the various agencies, including OFTEL, help them through the next five or ten years—the same phase as we have been through on network competition over the last ten years. An increasing amount of OFTEL's work, some of it frankly outside my jurisdiction in strict legal terms because my jurisdiction was defined in the 1984 Telecommunications Act, is about service providers and our dialogue with them. We are as likely to meet with Intel and with Reuters as we are with BT these days, though that is a slight exaggeration, but we meet them more than Mercury. We are attempting to understand how service providers—those people who are going to help industry revolutionise the way it does business and to bring interactive services into the home, equip schools better and so on—what problems they are facing and how we develop a regulatory regime which is going to help them through the next five to ten years. That said, we are only part of that wider picture. We do stray outside it and indeed outside my jurisdiction and indeed in the evidence we have already submitted I have responded to some questions which are not strictly my responsibility. But the overall tenor of my opening remarks is almost that network competition, infrastructure competition is a "done deal", to use the jargon. The problem we have is with the service providers, how they are going to help customers, business and residential, deliver the services we want in the 21st Century. And that is where we are, I think.

Lord Gregson

28. What interests me about our experience with the defence network especially, the one run by the Pentagon and in fact provided by Boeing, that famous contract, is that even in that circumstance it was always difficult to get a connection. At the moment on the sort of networks we have and the Superhighway, the customer base is tiny, it is minuscule, compared with the potential. I have great difficulty in seeing how an efficient interoperable service could ever be provided on that basis because at the moment, as you probably know, you can dial or call up some of the things and you will not get them until three o'clock on the Sunday morning in effect, and that is a very, very tiny service sector or current customer base that is providing that amount of lock-up. Can you see forward to the point where you can actually dial up and get the service you want within minutes because I honestly cannot see it?

(*Mr Cruickshank*) I cannot see why not. It is a matter of investment, because whilst I made some very glowing remarks about the way in which networks were being invested in in the UK and the like, it is not yet complete. So that investment which is now in hand needs to be completed, but it is then—and this is what my introductory remarks were about—it is then making sure that the service providers whom you, as a customer, in business or in your home, wish to access are able to get any interconnectivity between you and them, on the bandwidth they require, in order to deliver the service to you and the obstacles they face. And you were touching on some of them with the DTI, the obstacles of how to pay, encryption, security, intellectual property rights and so on. These seem to be the range of issues we have to solve for the service provider. The actual interconnection *per se* is done and if it is not done, we can deal with it in the weeks and months ahead.

29. To the quantity required? I am talking about billions and billions of channels in effect to provide that type of service. In broadband, encryption takes an enormous amount of broadband.

(*Mr Cruickshank*) Yes, but billions would be perhaps beyond even my ken. But we are talking about enormous capacity potential as the systems that are now being built are digitalised and the BT

Lord Gregson *contd.*]

system is rebuilt in a way that will enable it to carry much greater bandwidth.

Lord Flowers

30. Somebody said that we have an "Information Superfootway" at the present time and certainly I find that if I want to do anything or get any information from North America, I have to do it between six o'clock and eight o'clock in the morning, or if I want to go to the east, I have to do it at eleven o'clock at night. It is so damn slow during the working day. Are we not talking about that?

(*Mr Cruickshank*) Yes, and again I would say that the solutions to that are in hand. We need the liberalisation of international facilities—and it is a liberalisation which has not yet taken place around the world—so that the capacity is available. We need the service providers you are accessing to be able to get the connection they want from the network providers. But in principle, on an engineering level as it were, these are not problems in my view. What we are dealing with is the transitional period between the demand being apparent and the investment by the service providers being made, with the one exception of the international facilities liberalisation.

Lord Craig of Radley

31. Mr Cruickshank, you stressed the interest now in the service providers and clearly the importance you attach to ensuring that the customers get good value for money and a quality service. Both of those could be seen as fairly subjective judgments and indeed the extent to which they can be made objective will be very helpful to satisfying everybody that these particular issues are being successfully addressed. Could you say something about how you see value for money and quality being assessed and made widely known how you reach that judgment?

(*Mr Cruickshank*) Our goal is that UK customers, whether they are business or residential, should be the best served in the world and to test whether that is happening, we do benchmarking studies where we compare the experience of customers in the UK with those in other countries. Usually that means we are comparing the experience of the UK customer with the customer in the United States, with some exceptions even here around the world, but that tends to be the comparison. And indeed we have just finished one of these. What we glean from that is where the UK customer is being less well served and then we ask the question, "Is that because of some flaw in the regulatory regime?" and, if it is, we try and do something about it. Often it is not. Often it is about ill-informed purchasing, or it is about customers in the UK not exercising the choice which is available to them, which I find frustrating since we strive to give them that choice. But if it is to do with the regulatory regime, then we try to do something about it. So the test is the outstanding service around the world which means the United States and if that is not being achieved, then we try within the powers I have to do a bit more about it.

32. So the test is a relative one, not an absolute one?

(*Mr Cruickshank*) Yes.

33. You do not think it is possible to set out absolutes?

(*Mr Cruickshank*) I think it is possible, but it is wrong for me as a public official to be making such absolute tests and that is why it seems to me legitimate for me to do the relative test. I do not think it is legitimate for me to set absolute tests. Just last week we encouraged the industry to publish comparative statistics of their performance and again the same approach, not an absolute standard against which they would be judged, but to ask whether one company is providing a better standard than another to enable the consumer to make a more effective choice. That is the tenor of our approach always.

Lord Butterworth

34. My Lord Chairman, we had a discussion just before about capacity- limiting access to a system and I am wondering whether access is also being limited by incompatible standards, whether this limits the access in any way and what the job is of a regulator to deal with that.

(*Mr Cruickshank*) That is absolutely central to what we do. And if I can repeat what I said in my introduction, I am not suggesting there are no problems here, but to the extent there are problems, they tend to be commercial and accountants' problems rather than engineers' problems. And we feel we know what the problems are and we are tackling them. There are three classes of standards I think we would identify. There is interconnection between networks, ie, can Mercury interconnect to BT at a level and the functionality that it wants and at the cost it wants and, by and large, we are satisfied that that is working. Then there is the end-to-end connectivity, ie, between you and I as two customers of these networks, and we call it "interoperability". There we have a few more problems, but again the problems tend to be commercial ones about one company wishing to impose a proprietary standard on the industry rather than the actual engineering of the science of connecting between you and me. Then there is the customer equipment interface, ie, how the customer equipment connects to the network, and there the objective is to have competitive supply of equipment in the UK. We have again got some problems there, but they are not insurmountable. If you were to ask me where my difficult problems are, I would not classify these, but I would say that these and others I could list are part of the work of Peter and his advisory committee which they may be able to resolve in a systematic way. Some of the real issues are to do with copyright and navigational systems and all of that futuristic stuff which we do not yet understand properly.

35. So you are confident that with the powers that you have as a regulator you can overcome all of these problems?

(*Mr Cruickshank*) I have given you the present picture and the history. What we do not understand well enough yet are the obstacles that will be placed in the path of the new group of service providers. Hence our dialogue with them in order to tease out

Lord Butterworth *contd.*]

just precisely what it is they want, and then to test whether we have the powers which are required to solve the problem and, if not, what is to be done about it. That is the forward-looking effort we are presently engaged in, so I cannot give you a confident answer to the question, "do we have the powers?," because I am not sure I yet properly understand the obstacles that are in the path of the service providers providing the range of services that customers want.

(*Mr Walker*) I would perhaps add the thought which I think Mr Cruickshank has already made that standards do not exist out of context with the commercial difficulties and where we see issues coming up that appear to be technical incompatibility, it is usually the thought that somebody has tried to steal a march on the competitor by introducing something before another person and there is then an issue of should they adopt the *de facto* standard or should we for certain groups of standards say that these are so important that we should encourage the industry in the widest sense to come to some consensus ahead of time. The difficulty with that is of course predicting what these future things ought to be because it is usually better for the market to decide the winners rather than the engineers sitting around a standards committee and, secondly, one has to accept that at the level of the higher level application over networks, clearly one expects to see a degree of differentiation if one is to get competition in the delivery of services. Therefore, our firm view is that if one looks to try and harmonise standards in any part of this industry, it should be at the fairly base level to ensure fundamental connectivity across networks and not try and do the work of those trying to create these new markets in services by telling them how to do their job.

Chairman

36. I think we should take up your issue of service provision, but before we do that I wonder whether I could note that one of the people giving written evidence remarks, "The greatest change in the supply of Internet services may come from the arrival of the wireless transmission". Does your remit run well enough into that area to play a part there?

(*Mr Cruickshank*) The allocation of the radio spectrum and licensing are matters for the DTI. There, the Secretary of State is either obliged to or does consult with ourselves and we cast a very fatherly eye over the allocation of spectrum to the telecommunications industry and attempt to make sure that it is efficient and in the right part of the spectrum and indeed, therefore, we have encouraged the DTI to allocate spectrum to some new radio applications. Indeed the DTI is now presently in the process of allocating some such spectrum which would have the effect of creating another network. We talk about a mosaic of networks, and it would in effect be another national network for a range of services, though quite what services we do not yet know because that will be for the bidders to decide. So our role is to encourage and then, once these companies are licensed, they fall under my obligations under the Act to ensure that the licences are enforced and generally to be supportive of their endeavours. I am extremely hopeful of the ways in which the various allocations of spectrum, whether it be for the mobile companies like Orange or Cellnet, or the fixed radio access to replace wire connection (and a company called Ionica is about to launch that) or for the new spectrum which has just been licensed now and I am very hopeful that that will provide easily accessible, relatively cheap access to a surprisingly wide range of services that do not need the return path to be as large as the path in, as it were.

Lord Craig of Radley

37. Going back to the customer interest in all of this, I was interested in how correspondents replied to the customer interface with public networks question where you draw attention in your written evidence that the customer network interface is not something over which you have a regulatory authority. I would be interested to know whether you believe there is a need for regulatory arrangements there, whether OFTEL would be the right body or what indeed was the tenor of the response to that very interesting and important consultation document.

(*Mr Cruickshank*) You will recognise, my Lord Chairman, that we are in the process of consultation right now and I value that and we try not to reach conclusions before the consultation is exhausted. First of all, the response to the document was generally favourable, that OFTEL should have these additional powers or authority, let us put it that way, except for BT who felt that we should not. That is not an unusual position for us to find ourselves in, where the dominant company has a different view from the rest of the industry. That is almost a definition of dominance in a funny sort of way. There was a lot of numerical support, as it were, from the consultees, but the dominant company believed that the present arrangements were suitable. The question as to how we respond to that numerical majority, whether it is through proposing licence amendments or whether it is through our behaviour on fair trading, ie, licence enforcement and fair trading provisions, we have not yet taken a view on. There are some more detailed issues like notice periods, how long in advance of the introduction of a standard should particularly a dominant company be obliged to give notice, issues like that we have not yet come to a view on. But one way or the other we intend to tackle this so that there is rather more, if I can use the word, authority, rather than necessarily licence conditions, to deal with those problems.

38. But authority to do what?

(*Mr Cruickshank*) Authority to direct, issue a direction under the Telecommunications Act to deal with practices which are an abuse of the dominant position.

39. But you believe that the Telecommunications Act would give you, or whoever, sufficient authority?

(*Mr Cruickshank*) I can reach that position within the scope of the Telecommunications Act, yes.

Baroness Hogg

40. Given the remit it is proposed that you should have in relation to access to digital television, would that leave an uncomfortable gap in your remit in relation to analogue terrestrial and satellite television? Do you think you need your powers extended over them?

(*Mr Cruickshank*) The proposition is that we draw a distinction between digital and analogue.

41. Is that a reasonable distinction to draw?

(*Mr Cruickshank*) All the wise people say that governments should not regulate by technology and that we should not distinguish. However, I think certainly my view would be that analogue is on its way out and if we can put in place a measured, fair across all the different distribution networks, regulatory regime for digital, then in due course that will be the totality. As even the terrestrial analogue eventually moves to digital, so over the course of 15 years or so I think what we are now putting in place should absorb in two years, five years, seven years, whatever, all the present analogue activity. That is the framework within which we are working with the Government.

Lord Hollick

42. I infer from your earlier remarks that you see as one of the main challenges in this area the question of service providers.

(*Mr Cruickshank*) Yes.

43. What steps do you think you can take to foster service provision and possibly you might also like to think about what steps the DTI could take?

(*Mr Cruickshank*) Or your good selves.

44. I quite understand if you do not want to answer that. The second thing is really following on from Baroness Hogg's question. It would seem that convergence in this field is also likely to lead to convergence of regulators. How do we avoid a sort of nasty accident on the Superhighway between regulators all seeking to look at content because, whether it is analogue or digital, it is all the same content?

(*Mr Cruickshank*) I see regulators as more like the hedgehogs of the Superhighways! Perhaps I should not have said that. I do not think they are that important. The present regime, where the DNH, ITC, DTI and ourselves have complementary and quite well-fitted powers across the whole of broadcasting and telecommunications, ie this new communications industry, works with a little difficulty, but it works. However, it seems to me that some time between now and the end of the century a Communications Act is required to resolve not so much who does what but to resolve the appropriate regulatory regime for the new digital communications industry, i.e. eye-popping concepts in broadcasting and telecommunications. At some point that is required. As a subset of that legislation I would expect to see some rationalisation of the role of regulators. That is my private view. I have no influence on that process. However, for the moment we find it really quite feasible to work in a complementary way with the ITC and the DNH as well as the DTI. I wish I could answer your first question about service providers. One of my reasons for the introduction I made this morning was perhaps to encourage your Lordships to help me out somewhat. Just what is it that is required for various classes of customer, business and other, to deliver the things we want with the Superhighway? That said, we are not just sitting back. Can I ask Mrs Walker to tell you what we are doing and how we are seeking to generate some wisdom in what is a very opaque area for us?

(*Mrs Walker*) We are publishing early next week a document with some firm proposals from OFTEL about what we could do to encourage service providers. By service providers we mean people who are not building their own networks but want to provide services over somebody's network. We have had quite an intensive consultation process already with some of the service providers and the network operators about this and I think there are a number of worries that the service providers have got. They will be set out in detail in the document, but there are really two main ones. One is a concern that they are seeking to put content of all sorts over a network which is owned by somebody who is also a competitor of theirs in service provision and, therefore, they are looking to the regulators to ensure that there is fair competition. Some people have argued that to ensure fair competition there needs to be some sort of separation between BT's activities in the network and in service provision. Our document will argue that there are certain problems with that and it is not clear that that is in the customers' best interests. What we are clear on, however, is that as long as BT or—because I do not just want to focus here on BT—any other network operator who gets market power combines a role in the provision of networks with providing services over those networks, then a regulatory structure needs to be in place to ensure fair competition for those entering the market just for service provision. Our document will put forward some quite complicated proposals on that and we are going to be asking the service provider industry if we have got these solutions right. That is one major issue about the vertical integration of a major operator. The other is that at the moment if you are in the service provider business you can access the network at the same cost as you and I as retail customers access the network. There is some distinction but the distinction is not very great. I do not want to mislead you by saying that there is no distinction, but there are no significant distinctions between the prices charged to a retail customer and a service provider for use of the network. A service provider may be generating a significant volume of business over the network and it is looking for a different sort of connectivity with the network. One of the proposals that our document will put forward is that BT should develop a new series of charges for service providers so that they can access the network at more competitive rates, at lower rates. What our document does is to spell out some detailed proposals for that on which we shall be seeking comments. I should perhaps add that the really tricky element of that debate is not so much the comparison between the retail customer and the service provider because I think all recognise that there probably should be some distinction in the rates that they are charged for access to the network. It comes as you move towards

Lord Hollick *contd.*]

whether the service provider should be charged the same rates for access to the network as network operators are and that is a much more tricky issue. The network operator is investing a great deal of money in the network. Both OFTEL and the Government are very concerned, as you have already heard, about the development of network competition. Clearly people are not going to invest in networks if you can actually access the network at the same cost whether you are investing in a network or not and if you do not get investment in networks here in the UK, there is no doubt that we will face increasing band width problems, as Lord Gregson was raising earlier.

Lord Flowers

45. In this enquiry we are supposed to be talking about applications in society. As we get more and more electronic in the way we do our business we are going to have to deal much more with the concerns of the elderly, the disabled, the uneducated and the simply poor. Is it your job to think about them or is it somebody else's? I would be very alarmed indeed if it was left to the DHSS.

(*Mr Cruickshank*) It is not only my job. There is an obligation in the Act to ensure that any customer in the UK is provided with the services they may reasonably demand, so we are into the niceties of what the word "reasonably" means as we enter the information age. We interpret that at one level rather narrowly and we say that that universal service will be defined broadly as access to a digital line and that is what is being proposed, which actually gives everyone some degree of access to the Superhighway—

46. My ninety-year-old aunt cannot deal with access.

(*Mr Cruickshank*)—and at an affordable price. The next judgement that has to be made is about what affordable means. We have in place a light user scheme, we have in place price controls, which together have the historical effect of having reduced the cost of access to the network really quite considerably. And we would expect for that group of those who are elderly or disabled or whatever, to continue to benefit from some preferential terms. However, there are other classes of customers and you may have observed our interest in whether schools as a class should have special access to enhanced services—notice I use the term "enhanced services" and not the superhighway. The Highway is passing on. It is the issue not just of connection but about how schools are equipped for using those services to improve the quality of education. We prompted a debate over the last year on that which gave Government and the education community our support and we will pursue some proposals and ask the telecommunications industry to make its contribution to that. There is generally a services issue. And affordability and what is reasonable are the two questions to be answered there, and then quite separately the issue of whether there are special classes of customer who it would be in the interests of the UK to hook up and support on the Superhighway faster than others. And schools is the one that gains most attention.

47. Yes, and in the end perhaps will solve the problem, but in the meantime you have a lot of elderly people getting more and more alienated by technology and here we are, going for really quite complicated stuff if we do not treat them appropriately.

(*Mr Cruickshank*) Yes, and, interestingly, those who are not on the network. Yes, there is a large group of elderly, but they tend to be inner-city, low-income, young people with families who are mobile and the elderly and those with disability tend to be on the network. Whether they can and will be equipped to use what is available to them at an affordable price on the Superhighway is not strictly my role. That seems to me an issue for the further and higher education sector, I suppose.

Baroness Hogg

48. Could I just press Mrs Walker a little further on this issue of pricing for service providers to access the networks because I see this as key, not least in providing the services that will meet the diverse needs of the community. I was not quite sure that I followed through her argument to the effect that there was an argument in terms of investment for BT service providers to have cheaper access than outside service providers because surely provided the price to outside service providers is one that properly reflects the cost of investment in networks, there will be no disincentive to investors as a result of fixing it at that level?

(*Mrs Walker*) In a sense that is actually precisely what our document seeks to expand upon. What we are saying is that there are lower rates for interconnection with networks for network operators. That is because what they are actually buying is a different service over the network. What they are doing is hooking their network on to BT's and actually the link-up is somewhere in the middle of the network, whereas if you are a service provider, what you are doing is you are actually buying a service which runs from one edge of the network right to the other edge of the network. So we are saying there is a different function actually being purchased by network operators and service providers and, therefore, we believe that the problem comes because the service provider who is purchasing this particular service is not getting, well, at the moment what the service provider is actually purchasing is a service the same as the final customer which includes retail elements of the service which the service provider does not necessarily want to purchase. Where the service provider does not want to purchase that particular retail element and he is going to provide it to his customer himself, then we believe that there should be a differential in the price system to reflect that.

49. Thank you. I look forward to receiving the paper.

(*Mrs Walker*) We will send you a copy.

Chairman

50. The Sub-Committee will look forward to seeing that. I am afraid we are again running out of time, so if you would like to make any closing statement, Mr Cruickshank, please do so.

(*Mr Cruickshank*) I am tempted to repeat my opening statement and exhort your Lordships, as it were, to lift your eyes beyond the present process of standard-setting and the like to this issue of services, for whom, at what cost, and with what impact on society. I think, because of the investment that has been made in infrastructure and is being made in infrastructure in the UK, that is a privilege which you, as a Sub-Committee, have which many committees around the world do not yet have and they are still struggling with the issue. In fact we had the Canadian delegation sitting here whom I am meeting this afternoon who are struggling years back from the privileged position you are in and they are worried about where the investment in the network is going to come from. We have that investment being made and it is being translated into higher bandwidth on an increasingly affordable basis. How we are going to keep our edge and how we are going to exploit it, that is what I would encourage your Lordships to focus on. We, for our part, will be very happy to provide you with further documentation and evidence as you wish.

Chairman] Thank you very much indeed. I am sure as the study progresses we shall think of further things to ask you and if in the meantime you produce documents or think of answers to the tabled questions which have not been covered today, we shall be very glad to receive written answers.

Lord Flowers] Or if you think of questions that we should have asked you.

Chairman] Indeed.

TUESDAY 13 FEBRUARY 1996

Present:

Butterworth, L.	Haskel, L.
Craig of Radley, L.	Hogg, B.
Flowers, L.	Phillips of Ellesmere, L. (Chairman)
Gregson, L.	

Memorandum by the Cable Communications Association

The Cable Communications Association ("CCA") is the trade body representing the interests of cable network operators in the UK. Licences have currently been awarded for over 140 individual franchises across the UK, representing some 75 per cent of the country's population. Cable is already available to over 6 million customers throughout the country, with some 1.1 million telephone customers already subscribing to the television service and over 1.2 million customers. To date, over £5 billion has been invested in developing cable networks and by the end of the decade an estimated £12 billion of private capital will have been spent by our members constructing our modern, fibre-based networks capable of offering a broad range of services from entertainment through to voice and data communications. CCA research has shown that the growth of cable has created some 15,000 direct jobs in the UK and that this figure will rise to over 25,000 over the next four years. A further 10,000 jobs will be created indirectly in related industries.

This paper is submitted by the CCA in response to a request from the House of Lords Science and Technology Committee and seeks to answer those questions specifically put by the Committee. In this paper the CCA endorses the importance of establishing a national broadband infrastructure, or "information superhighway". As we will outline in section 1 below, the CCA believes that Britain is leading the world in the development of broadband infrastructure, and we therefore commend the Committee for focusing their attention on the development of the applications and services that will be carried on the "information superhighway" and bring tremendous benefits to society as a whole as well as opportunities for individuals. The type and range of services available should be as broad and diverse as possible, and should be dictated by the demands of consumers, rather than the availability of a particular technology.

1. The current form of the "Information Superhighway"

1.1 For the purposes of this enquiry, the Committee have defined the term "Information Superhighway" to mean "a publicly accessible network capable of transferring large amounts of information at high speed between users". To meet this demand, the "superhighway" requires a broadband connection to homes and businesses capable of transporting high speed data in both directions. The broadband channel provided to each home need not necessarily be symmetrical in providing the same capacity for information flow in both directions however, as most services envisaged require a greater capacity in the downward direction from the service provider to the customer.

1.2 *In the UK*

The basic infrastructure for such a network is being installed in the UK by the cable companies in the form of a mix of optical fibre and coaxial cable. This network has currently passed 6 million homes and by 2001 will have passed approximately 17 million of the 22 million homes in the UK. Cable operators are planning further coverage, possibly using radio links in addition to cable, particularly in the more remote areas, to extend this number to 85 per cent of the nation's homes. Cable operators have also begun to install high capacity trunk transmission systems to link their local franchise networks. The most notable of these to date is the London Interconnect which connects all the franchises operating in Greater London and the Northern Interconnect in the Manchester area.

1.3 The CCA, however, do not believe that the "Information Superhighway" will be constructed by one individual operator, and nor do we believe it should be. Today, the UK enjoys the development of several, interconnecting infrastructures. On the trunk side Mercury, BT and Energis operate long distance national infrastructures. At the local level, we have seen many new licences awarded, including Ionica, MFS, and Colt. Indeed, in the region of 150 PTO licences have been awarded for the provision of telecommunications services in the UK. We strongly believe that plurality of operators will benefit consumers. One of the fundamental policy tenets of the 1980's has been that if consumers have a choice of supplier and competitive service, they will receive the benefits of lower charges, higher quality of service and new, innovative services, This is certainly proving to be the case in telecommunications as recent price initiatives, the general downward trend of long distance and international calls, reduced waiting times for service installation and the introduction of premium features have illustrated.

1.4 *In the rest of the World*

Judging by the activity on Superhighway trials and allowing for national scale differences, the rate and development towards an "Information Superhighway" is broadly comparable with the US and the rest of the developed world. However, the cable networks being installed in the UK do give Britain a significant lead in the basic network infrastructure which constitutes the vast majority of the investment required for a "Superhighway". Almost 35 per cent of all the UK's homes have already been passed by the cable operators' broadband networks and this will increase to about 70 per cent by the end of the century. Whilst both the US and parts of Europe have cable TV networks passing over 90 per cent of homes, they were installed several years ago before optical fibre technology were economically viable and do not have the flexibility required for two-way communications. The CCA therefore believes that the UK has the highest percentage of installed network infrastructure suitable for a Superhighway in the world.

1.5 *Network Standards*

For telephony services, government policy has ensured that all networks are obliged to interconnect, so that any customer on one network can communicate with any customer on another network—the "any to any" principle. The CCA believes that the development of a global "information superhighway" should be based on internationally agreed standards which will enable the interoperability between different manufacturers' equipment and between networks, whether operated by cable or other telecommunications companies.

1.6 There are potential problems if diverse standards develop, but because relatively little of the electronics and software required to support a Superhighway has been installed, there have been few overall problems yet. However, open and internationally agreed standards are required if this global industry is to develop in a way which encourages competitive supply of services and good customer choice and value.

1.7 To set open standards for the wide range of equipment and software required to produce an "Information Superhighway" is a massive task and is being attempted by the international forum DAVIC (Digital Audio and Video Council) which has 200 members world-wide. Although the progress of this group has been impressive and rapid over the last two years, specifications which could eventually form standards are in their early stages. Specific examples where standards are required are:

(a) Authorising systems to allow the transfer of multimedia material in digital form from content providers on to storage devices used by service operators.

(b) Standard interfaces between service or network providers so that information can flow between networks operated by different companies.

(c) Standard interfaces between the digital servers and the network architecture.

(d) Standard interfaces between the network and the customer equipment which could be a personal computer or a specialised set top box.

2. SERVICES BEING PROVIDED AND/OR DEVELOPED

2.1 *Public Information*

The huge capacity and interactive capability of broadband networks will make them an invaluable mechanism for the distribution of public information. National information can be instantly updated and distributed—either to individuals in the home or to specifically targeted areas or groups such as local government offices or libraries. In addition, the local structure of the cable franchises enables the collection and distribution of truly local community news, information and services.

2.2 *Commerce and Finance*

The provision of fibre-optic cable ensures that business with high communications requirements can transport huge amounts of information in the form of voice, image, data or text at the speed of light. This will facilitate instant communications between multiple sites. On-screen information services, already available today, provide all businesses, no matter how large or small, with instant, up to the minute information such as the City dealing rooms have enjoyed for years. Many businesses are already enjoying the benefits of advanced telecoms features such as centres, leased lines, high speed LAN connections, ISDN and video-conferencing.

On a much broader scale, the creation of the "Information Superhighway" will have a profound effect on the whole commercial world. The possibilities that are already available include the ability to work from home, reduced travel through video-conferencing, the networking of computers with links to employees' homes or to databases and other information sources which in turn will lead to ready access to increased amounts of information. UK business will become more competitive through lower cost and increased efficiency. The employment opportunities will rise not only from the increased efficiencies in the workplace and economy as a whole, but also through new opportunities for the manufacturing industry, R&D, and in particular the UK media (TV, music and publishing) as the demand for new hardware and software increases.

For example, Videotron's Business Service combines real-time world wide stock market information, news wires and business TV services on a common PC based platform delivered via a conventional cable TV cable, enabling this level of business information to be provided to homes for the first time.

2.3 *Education and Industrial Training*

Education is one area that has attracted a high level of debate with regard to the benefits that the "Information Superhighway" can offer. New opportunities from remote "classrooms" having instant access to libraries, universities and other information sources in addition to high speed access to Internet and CD ROM services and the development of curriculum tailored, interactive programming will revolutionise the educational environment. In addition, once services can be accessed over the network, the exact locations of students becomes significantly more flexible. Rather than their presence being required in a classroom, students will be able to gain access via a remotely located terminal. This flexibility will also increase the range of the target users, beyond traditional school and university students and encourage the development of lifelong learning processes for people in all walks and stages of life.

2.4 The Cable industry has shown its commitment to ensuring that schools are able to reap the benefits of this revolution through the CCA's "Cable in the Classroom" policy which states that a free standard connection will be offered to every school passed by the cable network. Since this policy was launched in February 1995, over 500 schools have been connected to the cable operators' broadband cable and telephony networks. Schools that are connected to the cable network are also enjoying substantial savings on their telephone call charges and a number of advanced features to improve the value and efficiency of the telephone. A recent independent report carried out by the Consumers Association in June 1995, in "Which?" magazine stated that savings of up to 30 per cent can be made by switching to cable telephone.

2.5 Through a nation-wide resource like "JANET"—the Joint Academic Network—universities can use Cable to access the academic Information Superhighway. This network has been supplemented by "SuperJANET" which provides a high speed digital link, giving students and researchers access to a huge range of information, as well as linking them to other educational establishments around the world. Half of the "old" universities such as Aston or the University of Wales have connections to "SuperJANET" and a second planned link will make the connection interactive, with live pictures and discussion possible across the network.

2.6 *Health and Social Services*

The introduction of high capacity broadband cable allows hospitals to transfer images and data effortlessly and cost effectively between locations. "Telemedicine" is quickly evolving, enabling remote surgeries to be linked to specialist hospitals hundreds of miles away. Through the transfer of high quality images and fast, accurate data, patients can benefit from specialist consultations without the expense or inconvenience of travel. The opportunities for home care will also increase. Efficiency will be improved and costs reduced through the use of high capacity information links and the use of on-line databases. Within the West London area, a number of teaching hospitals are linking through "WestNet" a fibre network provided to the Health Authority by the cable company Videotron, enabling trainee medics to view and learn from specialist operations elsewhere in the city.

2.7 The capacity and speed of broadband networks is allowing a much greater flow of information between social service departments. It is also allowing greater access to information as data and records can be transferred or accessed quickly, efficiently and accurately. Remote surveillance technologies also have clear advantages for the elderly or housebound.

2.8 *Entertainment*

Today, cable operators offer approximately 40 channels of a wide range of television programming, including satellite, broadcast and video cassette delivered channels. Basic interactive programming is already available as standard in some cable franchise areas, whilst in others more advanced trials are taking place with such services as video-on-demand (which provides a wide range of programming material at the request of an individual), pay-per-view (where you only pay for a specific programme or service) virtual reality games played across the network, and other advanced interactive services.

2.9 Developments in technology will enable at least 150 digital channels to be provided over the existing infrastructure by changing only certain headend facility and network equipment. Many of the new services that will be offered on the digital networks will need new products and solutions developed to make them a reality, but as the customer base expands, more new services and products are being created, which in turn attracts more customers to the network, and so it goes on. In addition, services such as home-shopping and banking, travel and theatre or cinema bookings, directories and classified advertising will transform the way we utilise our leisure time.

3. WHO WILL SUPPLY THESE SERVICES TO CONSUMERS?

It is anticipated that there will be many, varied companies supplying the services, content, equipment and networks that make up the "Information Superhighway".

3.1 It is in the interests of all network operators to encourage the broadest development of services across their networks if they are to attract and retain customers in the long term. However, in order to retain the incentive to invest in new network provision, operators need the certainty that they will be able to continue to reach commercially-driven terms for the carriage of services on their networks.

3.2 The CCA believes that the development of new services will be undertaken by a wide range of operators and other companies. Some will be small companies, perhaps aiming their services at certain niche consumer markets; others will be large companies already well established in broadcasting, publishing or telecommunications. We believe that the interests of consumers, in terms of the range of services available to them, and the interests of UK media companies, in terms of their ability to develop services and to compete in the international market, will be best served and indeed will be stimulated, through collaborative ventures and co-operation by established market players. However, a balance must be struck between incentivising broadcasters, publishers, programme makers and network operators to take full advantage of the opportunities for service development and the need to preserve diversity and pluralism in media output.

3.3 *What service standards exist?*

Service standards both in the form of quality of service such as response times and availability and standardised customer procedures forming the ergonomics of the service will evolve with time and will be studied in the current and planned trials. Existing telecommunication service standards such as data transmission and the Internet will form a reference for related services on the "Information Superhighway", but service standards for new services will tend to be set by the market. Existing legislation on privacy, copyright and data protection is likely to be challenged and may well need to be updated to cope with new situations.

4. UNIVERSAL ACCESS

It has been argued that certain areas of the UK are uneconomic to service even via a copper wire for basic telephony services. BT has argued that it makes losses on some of its telephone customers, though recent work by Oftel has suggested the numbers may be much lower than previously claimed. The economics of installing fibre to every home today are not viable on pure commercial terms, and would only add to these losses, even with the inclusion of revenues from other potential services.

4.1 However, as stated previously, cable operators are currently constructing their broadband, fibre-based network past some 75 per cent of all UK homes and under their licences have an obligation to provide entertainment and other telecommunications services (except voice telephony) to all customers in those areas built out. They therefore have an incentive to supply other services wherever economically feasible. In addition, Local Delivery Operator (LDO) Licences have been granted to cable operators covering a further 1.7 million homes and this licensing process is continuing to cover further, so far unfranchised, areas. The new LDO licences are "technology neutral" and operators are currently looking at and developing means of delivering multimedia services using radio links and Multi-point Video Distribution Systems (MVDS) in those areas where it will not be economically viable to lay cables.

5. WHAT IS THE ROLE OF CENTRAL GOVERNMENT IN CONNECTION WITH THE "INFORMATION SUPERHIGHWAY" SERVICE PROVISION IN THE FOLLOWING AREAS?

5.1 *Leadership*

The most important role for Government is establishing and maintaining a stable, effective regulatory framework and working with the private sector to articulate a clear vision of the place communications can play in the UK's national, economic and social life.

Consumers today are reaping the benefits of competition in the local loop. Plurality of telecommunications operators has brought about lower charges, higher quality of service and new innovative applications.

Monopoly providers have historically shown little inclination to deliver these benefits. The current regulatory policy, as set out in the 1991 White Paper: "Competition and Choice: Telecommunications Policy for the 1990s, which provides certainty for all participants in the market, with clear dates for reviews of the present regime, and the unequivocal public statements of the President of the Board of Trade in relation to the Government's commitment to this policy are reassuring not only to the operators investing in the development of the UK broadband network, but also to the financial institutions backing those operators. The stable regulatory environment has been, and will remain, the catalyst for the massive investment required for the construction of a UK fibre optic network by the cable industry.

Obviously, Government could significantly stimulate the development of the "Information Superhighway" through their own purchasing programme.

5.2 *Promotion Inward Investment*

As at the end of 1995, £5 billion of private capital had already been invested in the broadband cable networks in the UK and by the end of this decade this figure is expected to rise to an estimated £12 billion. As outlined above in paragraph 5.1, this investment has been made on the basis of a clear, consistent and forward thinking regulatory regime. The stability of this regime is an essential element in promoting inward investment. The early liberalisation of telecommunications in the UK has encouraged many foreign companies to invest and use the UK as a "test bed" for when other markets open up across the world. The UK is also in a unique position to be used as an entry point for the rest of the European market.

5.3 *Promoting and Safeguarding the interests of UK firms world-wide*

The government's policy of early liberalisation has also enabled a large number of UK operators, manufacturers and service providers to gain valuable experience enabling them to export products, services and expertise to developing world markets.

5.4 *Promoting Network Compatibility*

The cable industry is already committed to using equipment and systems which will provide the maximum compatibility with other networks, customer equipment and service standards. Central Government could play a vital role in this respect by ensuring, via its statutory regulatory bodies, that existing dominant players are prevented from introducing closed networks based on proprietary equipment and software. Interconnecting to such networks would be difficult and customers would be faced with a confusing range of disparate interfaces and user procedures. Although more complex, this would be similar to the different video tape formats before VHS was accepted universally, or the personal computer industry in which a form of compatibility has been established by the dominant players. It would be preferable to achieve compatibility without market dominance in order to preserve competition.

5.5 *Access to Government Information*

The "Information Superhighway" will revolutionise the way the public could access Government information, both at the local and national level. Government information could be distributed universally or selectively at much lower cost and with greater speed. The ability to call for responses, either in the form of electronic voting, or the completion of forms by individuals could be facilitated quickly and easily across the network. A secure and sophisticated access control system will be required to ensure information is only accessible to authorised users and that confidentiality is maintained. Currently cable operators are using simple customer authorisation systems which are appropriate for limiting access to broadcast entertainment services only to those who have paid subscriptions. Forms of "electronic signature" will be required and much work is currently being undertaken in this area which will enable legal transactions and "ballot box" type voting electronically from the home. Government should have a co-ordinated approach across all departments, specifying open compatible systems which conform to international standards, with as much commonality as possible and common user interfaces.

5.6 *Security of Payment*

Secure methods of payment are essential and are already being specified in trials. Provisions to achieve this are included in the access control system outlined in paragraph 5.5 above. Alternatively separate arrangements using a credit card principle could be used. The cable operators are already operating sophisticated computer billing systems, so implementing such arrangements would be evolutionary in nature.

5.7 *Data Protection, Confidentiality and Censorship*

Legislation on the protection of personal data and privacy will set an objective limit in respect of the categories of data that may be stored, processed or forwarded to third parties. This issue was recognised by the G7 meeting last year, as being one of the key elements of a future legislative framework for the Information Superhighway. With regard to censorship, there would appear to be two issues. Whilst access control in a key issue for both subscribers and service providers, sophisticated systems will enable cable operators to verify that a certain customer is entitled to connect to a particular service and to allow only a specified range of services to be downloaded according to individual customer demand. However, the CCA believe that the network operator can not take responsibility for the content of services. If a network operator contracts to provide service to a customer who accesses a service that resides on a server connected to another network, it is not reasonable to expect the operator to be aware of the content that is being accessed, or to vet the remote service provider. In certain instances, data protection may not even allow the network operator to monitor the "calls". This is potentially a significant issue that will need further industry debate in the future.

5.8 *Verification of Information*

The provision of techniques to verify information provided on broadband networks is a recognised requirement. The DAVIC Group mentioned earlier is engaged on studying how information can be verified and systems including one called "watermarking" are being considered.

5.9 *Promoting the Development of UK Orientated Software*

The opportunity for the software industry is immense. Advanced new software will be required by all the sub-systems which form the "Information Superhighway", and especially for the user applications which will reside on or be downloaded onto the customer equipment (or set top box). A good start has been made by the DTI in this direction by the formation of a UK Telecoms Software Club set up to make the UK software industry aware and responsive to the needs of the telecoms industry. In addition, a study of the relationship between the UK cable and software industries co-sponsored by the DTI and the CCA has predicted that the value of software required for advanced broadband services is in the region of £50 million over two years which is significantly higher than current software requirements.

6. WHAT IS THE ROLE OF LOCAL AND REGIONAL GOVERNMENT IN CONNECTION WITH THE "INFORMATION SUPERHIGHWAY"? HOW CAN NEW SERVICES BE USED TO BOOST (A) THE ONGOING REGENERATION OF URBAN AREAS (B) OTHER LOCAL ECONOMIES?

As with national government, local and regional government offices should ensure a co-ordinated approach, specifying open compatible systems with common standards to ensure as much commonality as possible. Initial franchising of the cable systems concentrated around predominantly urban areas, so job opportunities are currently being offered in many of the locations where unemployment is traditionally at its highest. As franchising encompasses more of the UK, opportunities will become more widespread. The availability of remote training and tele-working are opportunities that local and regional government will be able to take advantage of and utilise in those areas where it is most needed.

7 WHAT WILL BE THE IMPACT OF THE "INFORMATION SUPERHIGHWAY" ON WORKING PRACTICES AND EMPLOYMENT PROSPECTS?

7.1 Teleworking is already a reality for half a million people within this country. A recent survey[1] showed that 25 per cent of businesses with over 5,000 employees, 14 per cent of firms with 1,000 to 5,000 staff and between 6 per cent and 10 per cent of companies with under 1,000 employees use teleworking. Cost effective national and international communications coupled with access to a sophisticated voice video and data network will increase the viability of this practice. Organisations already using teleworkers range from central and local government to financial service institutions and manufacturing industries. Employment opportunities will become less area specific. Advanced training facilities via the "Information Superhighway" will further develop the opportunities available for those living away from major conurbations.

7.2 The telecommunications and IT industries themselves will necessitate the development of a highly skilled workforce. UK Cable operators have to date directly created some 15,000 jobs, a figure which is predicted to rise to over 17,000 by the end of 1996 and to 25,000 by the end of the decade. A further 10,000 will be indirectly employed in associated industries. This skilled workforce will also be in a pole position in the emerging £60 million market across Europe as the EU's telecommunications liberalisation programme moves forward.

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[1] "The Shape of Things to Come" by the Home Office Partnership and Reed Personnel Services Plc.

8 IS THE DOMINANCE OF MASS-MARKET US SOFTWARE A THREAT OR AN OPPORTUNITY?

8.1 The obvious and relevant dominance being referred to is in PC operating systems and related applications software. This does constitute a threat to open interface standards as the largest US software company has already moved to establish its own de facto standards on the Internet and has formed links with content and broadcasting companies to move towards vertical integration in the supply of Superhighway equipment and services. Whilst it poses a straightforward commercial threat to potential suppliers of software, it also poses a threat to network operators and suppliers of other equipment as such a dominant player can form powerful alliances with suppliers and operators to form proprietary and closed networks. In the long term, users would suffer the absence of competition in the supply of services.

8.2 For this reason, the CCA would support a move for the UK to adopt the competition structure in Articles 85 and 86 of the Treaty of Rome, chiefly because of the inherent benefits of such a system but also because of the advantages of having a domestic regime which is fully compatible with the European system.

Examination of Witnesses

MR GARY DAVIS, Chairman, MR ALAN BATES, Director and MS SALLY DAVIS, Director, Cable Communications Association, called in and examined.

Chairman

51. Good morning, Mr Davis, welcome to you and your friends. Thank you for coming. Perhaps you would like to introduce yourself and your colleagues.

(*Mr Davis*) Thank you, my Lord Chairman. My name is Gary Davis. I am the Chairman of the Cable Communications Association and Managing Director of Diamond Cable Communications which is a company located in the Nottingham area and the East Midlands. To my right is Alan Bates. Alan is a director of the Cable Communications Association and also a Director of Bell Cablemedia. To my left is Sally Davis—no relation—she is a Director of the Cable Communications Association as well and is Director of Strategic Development for NYNEX Cablecomms in the United Kingdom.

52. Would you like to make any introductory statement?

(*Mr Davis*) If I could please. As you are all aware, I am sure, the CCA represents the interests of all companies operating in the provision of cable television and telephone services in the United Kingdom. Our industry is fully financed by the private sector and today we have invested over five billion pounds in providing the United Kingdom with one of the world's most modern and sophisticated optical fibre networks. This year we will be investing a further six million pounds per day, that is seven days a week, with a total investment by the end of the decade of about 12 billion pounds in building this cable infrastructure. Our networks have so far been constructed past over six million homes with another 2.7 million homes being past by the networks this year in 1996. Currently we are connecting over 50,000 new telephone subscribers and 40,000 new cable television subscribers each and every month. Those numbers will grow as we go forward. Also, we are creating 25 new jobs each and every day seven days a week. Cable will provide a long term fundamental benefit to the national economy. By investing in infrastructure and producing and introducing competition we drive down prices in telecommunications and the entertainment services that are being provided. Cable companies are providing a boost for United Kingdom businesses and to consumers, saving them money on their telephone bills and providing them with new and innovative services from which they were excluded in the past but that is just today. The fibre based networks we are building will provide even more far reaching benefits. The United Kingdom Government has given great encouragement to the cable companies to instal their broad band networks and that puts the country in the forefront of the world in terms of communications' infrastructure. Therefore we welcome the direction of this Committee's enquiry. As I hope I have outlined above, the question is not who will provide the networks, it is already happening. We, the cable companies, are building the networks as quickly as we can physically do it. The development of applications and services, which is what this Committee is focusing on, is therefore now the key question. It will be these applications and services that transform the networks that we are building into the information superhighway. With that we will be glad to respond to your questions.

53. Thank you very much indeed. Could I begin by saying you have made it clear that you are much involved in the provision of infrastructure, the network. To what extent—your paper gives the impression it is totally—are you vertically integrated? To what extent are you in the business of providing the services and the content of those services also?

(*Mr Davis*) From a content point of view, we are rather dependent on other providers who are developing content. From a practical point of view, most of the cable companies are developing local channels which will develop local programming which will be of interest in the various local communities that are being served. This is a unique opportunity because regional television of a terrestrial nature by its very nature is regional and therefore cannot focus as much on each individual community. All of us in the cable industry are developing local channels which will provide that opportunity for focus at the local level and for development of programming and creativity at the local level. Other than that, there is not a great deal of vertical integration within our industry in terms of content, although all of us are supporting, in every

Chairman *contd.*]

way we can, some of us by financially investing in companies that are developing new programming. We all agree, as an industry, that the greatest need for content right now for our infrastructure is more good British programming as opposed to more important programming.

(*Mr Bates*) If I can add to that, as an industry we have financed the Parliamentary channel as one of the new channels.

(*Mr Davis*) Certainly.

(*Ms Davis*) If I can also add to that, when we are talking about applications for the information superhighway, we are really treading on very new territory here. Fundamentally we believe that the people who are best able to develop those services are in fact our users. A number of us have got a number of trials and projects going in association with partnerships with different users, with local communities, with local councils, with universities to try and work together to identify these new services and applications and bring them to fruition in a market service.

Baroness Hogg

54. Might I follow just with one more question to our witnesses about this partnership for development of services. It is early days, as you say, but which look to you to be the most likely to fly of those who have been, as it were, partnership sponsors?

(*Ms Davis*) Indeed, that is one of the questions. Frankly, we do not see any one single strand of programming or content or service which is really going to be the pull through of the whole information superhighway. I think that what we have now is a consumer population which is very sophisticated and more fragmented. You are not going to find one application which appeals to absolutely everybody. I think you may find two, three or four themes which are developing. One of those we believe is education. I think in the home parents want to see children have access to good data for information to be able to do their homework from home, maybe dialling into a homework classroom to exchange maybe with teachers or friends problems that they are having on that particular area of homework, obtaining access to reference books remotely. I think all of that type of development is happening. At the same time people are wanting to learn new skills with computers, again in their own homes so that they feel trained to enter the job market. I think there is a whole education aspect which is really being developed. In the cable industry we are very strongly supporting that. We have a programme called Cable in the Classroom and we have now cabled approaching 1,000 schools. By the end of this decade we estimate that getting on for three quarters of the schools in the United Kingdom will have been cabled by cable companies and naturally passing our network. We provide that initial connection free of charge. We are working on a number of projects with schools to extend that into the community and develop these types of applications for children to do homework. I think a couple of other strands will be important: working from home. Again, we are going to see companies changing, there is lots of discussion about the virtual company. We are going to see changing relationships in our organisations and much more loose affiliation of partnerships working together. I think the requirements for people to go out and work from home, again accessing remote information, being able to send quite complex files between working sources will be another important driver. Finally I think another driver that we see is games, information games, games which may be educational and games which are purely fun games and maybe forming local networks with games' players in different parts of the country. We see that as an important drive. I think if we were to choose three streams those are the ones that currently we see emerging but certainly not exclusively.

Lord Craig of Radley

55. What about marketing and point of sale use?

(*Ms Davis*) Those will emerge but I think there are some important sources here. You have some established players who have got on the one hand the brand manufacturers who would like to have direct access to consumers, on the other hand you have the supermarket chains who are also very strong entrenched players. I think that is an issue which will have to be addressed, if you like, between those two sources. One of the problems about shopping from home is fulfilment: how does the individual physically get that product? That is quite a big area where you have to look at the economics of distribution of that product directly into the home. Having said that, we do see home shopping, home shopping exists today on cable. We have home shopping channels, after a slightly rocky start they have begun to develop a good quality of product and are learning to establish what products will sell well over that medium. It is beginning to emerge. I think shopping is also a social activity so it may take a little longer. It is certainly a strand but perhaps not what we see as the driving strand.

(*Mr Davis*) Just to add to that, from a marketing point of view, product information in much more detail than is available on one A4 sheet in a magazine is probably another great benefit. We are already seeing that on the Internet. It is much more vividly illustrated on a full moving video channel with sound than it is on the Internet.

Lord Gregson

56. A number of the applications you have suggested, particularly the systems for homework, would imply interactive networks. We have not got one yet. When do you expect interactive networks to be effected?

(*Mr Bates*) The networks the industry are putting in are capable of being interactive.

57. I do not know if they are capable but when is it going to happen?

(*Mr Bates*) We are seeing the beginning of it now in terms of interactivity certainly at the textural level.

58. Can you explain that?

(*Mr Bates*) There are various levels of interactivity and the Holy Grail is where you have full video, full

Lord Gregson *contd.*]

vision in both directions. Whilst the networks are capable the technology at either end has not yet reached that stage therefore you get to it through a series of steps. For some time it has been possible to inter-relate by typing. It is now possible to have small micro cameras on PCs which give you again more of that video Holy Grail. We are going through a process, we need to have things called cable modems which will enable the broad band of cable to be used in both directions. These things are coming through. In terms of timescale, the cable modem which is so critical to this development, we are starting to see these being trialled in the US and I would imagine over here within the next year or 18 months.

59. Some time off?

(*Ms Davis*) I can add to that: we are trialling cable modem right now in a number of locations and if we can we will introduce them this year.

60. Some applications sound very attractive, for instance helping children with their homework, I am all for it. We have a standard curriculum now so homework is set. You have a channel for helping children, you might get 70,000 calls at the same time, everybody sits down to their homework after tea. How do you handle that amount of information transfer?

(*Mr Davis*) I think that is where the localness of cable systems comes into play—

61. You have a number of centres?

(*Mr Davis*)—the fact that they need to inter-relate with the institutions within their own community.

62. In a community you might get 1,000?

(*Mr Davis*) Yes.

63. Same question: how do you handle that? If you introduce a queuing system you will be there all night. What is the reality of that?

(*Ms Davis*) If I can answer that. Interactive systems are not sequential in that nature, it is not like making a telephone call where you have to sit in a queue and have a voice response at the end. The way the Internet, for example, currently works is you put your message in and somebody else reads it and responds at a slightly different time. It is a real time process that is going on and several messages could enter a system at any one time.

64. You have to wait?

(*Ms Davis*) You may have to wait for a response but you will then get maybe several responses to that one question.

65. It does not make sense on the network. You get the same question asked a thousand times within minutes of each other, you are not going to be able to answer them in that timescale, are you? The kid will have gone to bed by then.

(*Mr Bates*) If you take it down a level. In the company I work for, we have got some developments going on with schools in a very local area, in the Watford area. We are talking about half a dozen schools, we are talking about children in half a dozen classes from those schools therefore and you are not talking about a thousand, you are probably talking about at one time maybe ten, maybe 15.

66. Try Manchester Education Authority for a start, that is well over a 1,000 doing the same subject at the same time in 132 schools.

(*Ms Davis*) It is not intended it should be done in a national area—

67. Manchester is not a national area.

(*Ms Davis*)—or in a local area or regional area, the intention is that you are going to be putting the student in touch with the teacher in the schools on a much more regular basis. It may well be that for example you have a particular subject on the curriculum and the teacher has set some homework and then the teacher says: "Well if you have difficulty with this piece of homework during the evening or during the next week while you are doing it, you can send me a message on this system and I will then be able to respond to you" or you can send this message to other of your pupils in the class. You could be talking about a maximum of 40 pupils, or 30 pupils hopefully, actually working with their teacher on that item remotely. We are not talking about thousands.

68. It is just like ringing that teacher up on the telephone?

(*Ms Davis*) Yes.

Baroness Hogg

69. It is an E-Mail system?

(*Ms Davis*) Yes, it is a sort of E-Mail system but also giving you further access to other information, for example. If they did not take the right notes in the class, for example, or they wanted to access something he said.

70. In your written evidence—and you have given us further interesting information just now—you talk about the scale of investment by the industry. Can I ask you to say a little more about when you are expecting to see a return on this massive investment? Could I also add to it this question about the development of the industry? Like any industry there are going to be successes and failures among your members. Looking ahead what sort of security can those connected up to a cable system look to have in a rapidly changing market?

(*Mr Davis*) Let me ask my colleague Mr Bates to address the first point and then I will take the second point.

(*Mr Bates*) The industry is really still in its infancy in that it was not until the duopoly review that the market for finance coming in opened. The rule of thumb within the industry is that one is looking at long term investment of something around seven years before you reach the magical moment where you are making your first profit. There are two steps in that process. The first is cash flow. When do you get cash flow positive which is when your costs are exceeded by your revenue, ignoring all the infrastructure development, the digging of the roads and all the rest of it. There are some companies in the United Kingdom who are just about to reach that particular critical point. That takes something around three years to get to.

71. To operating profit?

Baroness Hogg *contd.*]

(*Mr Bates*) To operating profit and then your real profit after you have paid back all your investment is about a seven year time frame.

(*Mr Davis*) With regard to the second portion of the question, the network we are building is very capital intensive as you have correctly pointed out. The asset base though was not just that physical asset, the network, it is the network of customers we are putting into place. What we are about is not trying to garner an entire market, we are segmenting the market and garnering a segment of that market. Over time, because of the nature of the network that we are building, we will be offering these additional services and these additional products over the network which will gain additional shares of the market. When we add all of these revenue streams together it creates the business in its totality that is a sustaining business plan going forward. I think it would be extremely unlikely to see a cable company fail based on that premise. There is another factor which is working in favour of preventing a failure and giving security to those who are investing in cable and to those customers who are taking the service and that is the consolidation that has occurred in the industry. The fact is we have gone down to about 16 players in the industry now and we see further consolidation going forward so they are ready buyers.

Lord Craig of Radley

72. Of those new streams of revenue and new customers, how much is really new and how much is a change of customer orientation to your product as opposed to some other providers?

(*Mr Davis*) If we look at the video area, because that is the one that is most visible right now, I think, we see theatres, terrestrial television, video tape rental companies, satellite television and cable television all competing for customers who want to view video products. The difference between each of those purveyors is the time window in which they can deliver that product. Some people wish to see the product at the very earliest time window they can possibly do and they are willing to pay more to have that opportunity, therefore they go to the theatre and pay as much for a family of four to go to one sitting of the theatre as basic cable costs for a whole month for the family. Consequently, those are all slightly different segments of the same product but as we grow and as we develop the multi media products and the interactive products, there we are going to begin to see a new type of product come in that is not currently available. Certainly if you made a comparison with say a PC with a CD Rom which had an interactive encyclopedia on it, you might call that competitive with gaining access to information over a local area network that we were delivering on our cable system. There might be some competition there but it is very limited. I would say that as we deliver the multi media products and the broader range of interactive services, whether they are home shopping or home banking or whatever that comes out in the future, it is a growth in new products that is going to create more jobs, require more development, require more investment in collateral industries to support as we go forward.

Lord Flowers

73. In paragraph 1.5 of your paper you talk about the need in a global information superhighway of interoperability between equipment and networks and of course you talk about internationally agreed standards. All that sounds very sensible but I wonder to what extent the lack of such standards at the present time is acting as a barrier to growth of the information superhighway?

(*Ms Davis*) Fundamentally we do not see that lack of standards is the real inhibitor. Frankly we see the real inhibitor to the development of those applications is understanding user needs, how are people going to be using these applications, what value does it have for them and therefore how do the economics work out. I think we are very much in the trial phase and we are very much in the early days of understanding really what people want, what the consumer wants. That is not to say that whilst we are carrying on that work we have not simultaneously got to progress discussions on standards and we think that it is absolutely appropriate to do so. Then the question is how should we best go about setting these standards? Our real belief is that from our own experience in this industry and in the telecoms industry in general frankly governments have not been very good at setting standards for industry. Therefore we believe fundamentally that it must be the industry players themselves who get round the table to set these standards. We have been very heartened by activities particularly in the DAVIC forum, which is mentioned in our paper, which has really moved very fast in a very short period of time to address some key issues in network equipment and interface equipment and is moving quite rapidly now to setting standards in these areas. This activity is backed up by fora such as ETSI who we would like to move perhaps a little faster in certain instances but it is very complex getting many different representatives around the table to reach agreement, we believe that is happening. We do not believe that lack of standards are inhibiting growth today. Nonetheless we believe that we must continue to work rapidly on developing new standards, that DAVIC and ETSI are appropriate bodies to do that, that good work is being carried on in those fora. I think we feel confident that the right standards will be developed during that time. There is one other aspect of this and that is inter-connectivity of networks here in the United Kingdom at the national level. Here we see that the prime body to have a role is Oftel and again we have had many discussions with Oftel and Oftel are very aware of the role they need to play in inter-connectivity and in interface. In fact I was very heartened by a statement from Sir Peter Bonfield, the Chief Executive of BT the other day, stating that no longer can you talk about one national superhighway, that is not an appropriate model any more but it is going to be a network of inter-connected networks. That is how we see it, it is how we have seen it for some time. It is how Oftel sees

Lord Flowers *contd.*]

it, it is how BT sees it. I think we will now get full co-operation from them in bodies such as NICC.

74. Are there various national Oftels, Oftel is the British one but are they working together sufficiently constructively to make sure that gradually the standards will emerge?

(*Ms Davis*) I believe so. In the ETSI forum in particular, which is the European forum, and in DAVIC which is the worldwide forum.

Lord Butterworth

75. How do you see the European Union fitting in because they are going to come in on 1 January 1998? Are they going to create local European standards? How are they going to relate to what is already coming into being?

(*Ms Davis*) The ETSI standards are standards for all of the European countries and therefore would be adopted by the different Member States of the European Union. The liberalisation that we are going to see in 1998 is in fact a very important move we believe in opening up these markets and developing a European superhighway but all of those States will abide by standards developed by ETSI.

76. That has been agreed has it?

(*Ms Davis*) All of the participants in ETSI are all of the European telecoms operators and manufacturers so they already all participate in that standard making process.

77. Deutsche Telecom, French Telecom, BT will all play to the same tune?

(*Ms Davis*) They are all members of ETSI and ETSI themselves work with all these different operators to derive consensus and to derive standards. Frankly that is why it is something of a time consuming process. The DTI here, and specific members of the DTI, has been very instrumental in trying to streamline that process and enhance it and accelerate it.

Lord Gregson

78. During the time you are talking about you are going to get other interposing technologies coming in very fast. You are going to get digital broadcasting, digital networks now being introduced. In the middle of all this you are going to get high definition as well. They are all flooding in as fast as they can possibly go. They will all impinge on your standards, if you do not have a standard for high definition throughout the world you will be in a hell of a mess.

(*Mr Bates*) The industry is in a very, very strong position in that the fibre optic cable that it is putting in is technologically neutral. The industry, therefore, will be able to take on board the digital and the high definition television developments.

79. So can satellite?

(*Mr Bates*) The difference between satellite and the cable industry is the interactivity.

80. Exactly, that is why I asked the question.

(*Mr Bates*) Certainly satellite can go digital, certainly it can use the wide framed television. What I am saying is in terms of the ability of the cable industry to deliver whatever product is coming down.

81. The question I am asking is this is going to react upon standards, standards will become acute, it is chronic at the moment, it is going to become acute, are you going to be able to deal with that? It weighs in on it.

(*Ms Davis*) Yes. Today both the Cable Association and various of the member companies have direct representation on these bodies. This is both in DAVIC, ETSI and with Oftel and something called the NICC which is the appropriate interface body. We take this matter very seriously. It is very important that we contribute to that debate. I think there is one final point I would add, that what is unique about the cable service is that we effectively supply a set top box to customers. We supply that piece of kit in the home and we change that out as technology changes. In effect what we are doing is providing a technologically neutral face to the customer because I think one of the potential casualties, if you like, in such a rapidly evolving technological marketplace can be the consumer. We take that risk because we supply that set top box, when another technology comes along we take that one out and we give them a new one. That is not frankly the case with some of the other technologies. Satellite, for example, many customers own their satellite dish and their box. For them to make that change into the digital future requires them to make a new investment. We feel effectively that we are providing the infrastructure and we are going to make that as consumer friendly as we can.

Lord Butterworth

82. I wonder if I could go back to something I think Mr Bates said earlier. You gave me the impression of a single system being put in over the whole country, and I think you referred to an optic-fibre system, did you not?

(*Mr Bates*) Yes.

83. What percentage or to what extent is it in fact optic fibre? I ask this because I came across an instance in Coventry where the kind of cable being put in was not suitable for a two-way operation. Could you give us a little more detail about how much of the system is optic fibre and what is the rest of the system?

(*Mr Bates*) The industry started in 1985. At that time the deployment of fibre-optic cable was not as widespread as it is now. Certainly Coventry is a very strange situation, in that the cable operator in Coventry actually has an arrangement with BT to use BT lines, so Coventry is a rarity. The rest of the industry has been deploying fibre-optic cable closer and closer to the homes. The industry as a whole now is putting fibre to units of approximately 600 homes, and then it will go into other technologies. The fibre therefore reaches as close as the economics justify at this moment in time. The entire industry, for at least two if not three years, has been putting in this sort of infrastructure. As Gary said in his opening remarks, we have passed something like 6 million homes. I do not have an exact figure, but my judgment would be that we have probably between 4 and 5 million of

Lord Butterworth *contd.*]

those homes utilising fibre-optic communication as far as it is necessary to utilise it.

84. That is having regard, is it not, to the present use?

(*Mr Bates*) Yes.

85. If more services were required, then that last leap into the home might well require some other form of connection to what you presently have?

(*Mr Bates*) What we put into the home as an industry at the moment are two connections. From that 500 or 600 node we put in a coaxial cable which can carry full-width video, television or anything else you like, and we put in twisted pair copper for telephony. The bottleneck therefore is not within the system. The home only needs this coaxial cable for video. It is later on up the system when you would get a bottleneck if you were not using fibre. Certainly I would expect that the development of the technology will mean that we get even closer to homes as time goes by with regard to putting fibre cable in, but it is not a bottleneck in terms of the way in which the industry has structured itself.

Lord Gregson

86. So your interactivity will be on a twisted pair?

(*Mr Bates*) No, the interactivity will be on the coaxial cable.

(*Ms Davis*) Using modems.

(*Mr Bates*) Yes, that is coaxial cable using modems. Anyone can use the twisted pair; that is yesterday's technology.

Lord Flowers

87. Can I ask you how much a cable modem is likely to cost in the near future?

(*Ms Davis*) Based on the way we operate, we would not be asking customers to purchase one. Generally, we would supply it on a rental basis. Frankly, we are talking with manufacturers at the moment about trying to get the best price for that type of device. They are pretty expensive, so you have to be talking about sufficient volumes to bring down the price to a rate at which we would be prepared to rent them at a good rate.

Lord Gregson

88. Are you saying that in fact your 600 node is in effect switched 600 times, so you can have interactivity on all 600 lines going into the home?

(*Mr Bates*) Yes.

89. So you have a switching system going in at the home?

(*Mr Bates*) Yes.

90. The ones I have seen going in are not switched, they are distributors.

(*Mr Bates*) The effectiveness is to have interactivity at the home through these 600 home nodes, but you do not actually have a switch.

91. We are back to the textual problem, are we not?

(*Mr Bates*) No, we are actually back to definition terms of what is there. The key thing is that you can have interactivity broadband in the home with the technology which has been put in at the moment.

92. So long as you do not have 600 interactions at once?

(*Mr Bates*) You can handle it with 600 interconnections in. It can handle it.

(*Mr Davis*) It will handle 100 per cent interconnection.

Lord Craig of Radley

93. Can we turn to the concept of kiosks and the introduction of them to provide public access to a wide range of information and services? I would be interested in your thoughts about this approach, whether you would support it and who indeed should provide such a service.

(*Mr Davis*) Let me begin, my Lord, by saying that I am familiar with the kiosk system which has been developed in Canada, which has been fairly widely used in Canada. We look at what we are providing again in terms of this locality of the cable systems, the fact that we are trying to deliver what the community wants, what the community needs and what the community can afford to use. Consequently, when we look at the kiosk system we have to address it in terms of local requirements, who are the users going to be and how are they going best to use it. Our network is fully capable of carrying the information which is required to support a kiosk network of any kind they care to use. When we take into account that our installation costs are generally extremely low compared with other operators, and that our usage costs are generally from 15 to 30 per cent cheaper than other operators', then we become the network of choice for operating any kind of a system. Perhaps I can give a couple of examples. For example, in the Nottingham area we are a partner with the city council and other local businesses developing a system called EMNet or East Midlands Network. It is very much like an Internet network, but it is local and all the businesses can use it to relate to other businesses and find out information, find out if a product which they want is available locally, rather than having to go to London, Birmingham or somewhere else to purchase their product. It provides broad information about all of the member companies to all of the other companies who are subscribing to the service. Our part in providing that network is to provide all the circuits. We are doing that on a free basis during the initial two or three years of testing the programme to see that it works. If we were to look at tapping a kiosk into that network and broadening the range of members and the information provided on that network, that would be a very simple, easy thing to do, and eventually the cost would be borne by all of the members paying a share of it. One of the members, of course, would be the local council. If we look at Wandsworth Borough Council, Videotron has been working closely with Wandsworth and will shortly be launching a service called Council Life. This is an information-based service of which a number of pages of text and video will be dedicated to a comprehensive kind of A to Z listing of all the council services, whom to contact, where to obtain services,

Lord Craig of Radley *contd.*]

plus a newsletter, a bulletin-board service and a kind of local "What's On" service for all of the activities, particularly in council-owned venues. A number of cable operators are providing similar services for their own councils. In our case, in the Nottingham area we have made a channel available to be shared between the city council and the county council and any other district councils who want to put information on that and provide the information for them to do it. The kiosk element itself is such that it is the utility which is going best to access this information in the long run. We think there may be a need for it to be slightly more sophisticated than a simple kiosk. It may need to be PC based or something of that nature.

94. With the user making some sort of payment to gain access?

(*Mr Davis*) I think it is more likely to be supported by the people who have information on the service, as opposed to the user.

95. Do you then not see problems with somebody, as it were, surfing this kiosk and remaining in it to the exclusion of all other potential customers or users?

(*Mr Davis*) I guess that is the advantage of these high-capacity networks that we are talking about, which is that it is virtually impossible to fill up the capacity. You would have to have virtually everyone in town trying to access it at the same time, in order to do that.

96. I was thinking of the queue behind me in the kiosk.

(*Ms Davis*) You are thinking of public phoneboxes. Peer pressure gets you out of that!

Lord Gregson

97. The information café is what I am thinking of, whereby you rent out a place in a station or something like that. Is that not going to be the pattern for the future?

(*Mr Davis*) I think it could be.

98. The security of these kiosks is going to be virtually impossible, is it not?

(*Mr Davis*) I think it is more likely to be, and you are going to see it developing, in libraries. We would fully expect to see it developing there.

99. I visited the information café in London, and I would rather go there than to any public library, I assure you!

(*Mr Davis*) It is a bit more entertaining.

(*Ms Davis*) They also serve a better cup of coffee!

Lord Haskel

100. I would like to get down to the question of how many jobs are involved in the cable business. You said that you are creating 25 jobs a day. Can you tell us, are these long-term jobs? Are these jobs which will disappear when certain installation work has finished? Also, what is the impact of these jobs on other work? Are these replacing jobs because the technology is changing, or because shopping is changing, or because communications are changing, or is this a whole addition to the number of jobs available?

(*Mr Davis*) Let me begin by letting Alan address that question, then if Sally and I have anything to add we shall jump in.

(*Mr Bates*) There are really three distinct types of jobs which are being created as a result of the development of the cable industry. There are the jobs within the cable industry. At this moment in time we are looking at something like 15,000 jobs, and the expectation is that this will rise to 25,000 jobs by the time the industry has developed out. They are directly related because they are employed by the companies. There are then the indirects—that is, the construction activity. There are considerable numbers of jobs at the moment. About 10,000 people we estimated are indirectly employed, and that will rise as we hit the peak for building during 1996 and 1997 of something like 15,000. The third category are those people who are employed to provide services. We are talking about the additional programming, we are talking about the software industry because the cable industry requires computing systems, we are talking about the development of the digital technology and the equipment which comes through that way. Therefore, there are these three categories, and we can certainly identify those whom we have some control over—the directs and the indirects. We do not really know how many are involved in the development programmes or the software. In terms of the final part of your question, that is definitely much more difficult, because really we are in no way able to measure the impact of technology. Very clearly, it changes employment. Certainly we are an enabler, and we would therefore expect that people are enabled, but we have no way of knowing how many people are coming out of one type of industry into the new industries. All we know is that it is happening.

Chairman

101. Do you want to add to that, Mr Davis?

(*Mr Davis*) No, thank you.

Chairman] Perhaps we can go on, then, to equality of access and universal services to all areas.

Lord Craig of Radley

102. That really is a question. What measures should be taken to ensure that equality of access and universal services are provided to all areas in the United Kingdom at the moment?

(*Ms Davis*) I think there are two aspects to this. One is a geographical aspect—how physically do you reach every part of the United Kingdom? The other one is affordability—how do you make sure that everybody can participate in this? They are quite separate. When you look at the geographical aspect then clearly we already have one national network, which is British Telecom. We actually have another national network which, if you like, is a satellite that reaches everywhere and is ubiquitous. However, what we really believe is the answer to getting true service throughout the United Kingdom is allowing competing networks to build. We now have cable,

Lord Craig of Radley *contd.*]

and I think that once all of the cable franchising has been completed and the builds have been completed, you will have cable passing 75 per cent of households in the country. That is a very, very high proportion. You are then left with saying what about that other 25 per cent? What you are beginning to see is new technologies emerging to reach that 25 per cent in an economic way. A very good example of this is Ionica who everybody expects to launch this year. Ionica are using radio frequencies to get into those other areas, and it is very economic technology for those types of areas. Recently the Government went out to ask for applications for people to use frequencies in the 2-GHz bandwidth. So again new people are coming forward to apply for those. In some of those that really does reach areas which cable has not reached yet, so I think you are increasingly going to see new technology emerging which will allow us to reach all parts of the United Kingdom with competing networks in an economic fashion. Therefore, to a very large extent I think that the geographical issues of universal service are, and will be, addressed by evolving technology and technology which is evolving very rapidly. I think that then the big issue becomes affordability. In fact, all of the work which Oftel has done has shown us that that really is the critical issue for universal service. Again, we firmly believe that competition is the most important aspect in order to drive prices down to deliver affordable services. Already today in the telephony business some 10 per cent of our customers are coming onto our network and using telephone for the first time. That is because they do not have to overcome a high barrier to entry, they do not have to pay a high fee for actually coming onto our network. To connect to British Telecom for telephony is quite a considerable sum of money. For cable customers it could be just £25 alongside their cable television service. It is a very affordable way to become one of the "phoned". That access, along with our very much lower phone charges, means that we are able to get access to this really essential part of everyday life. So we believe that in order to address the affordability issue you need to have competing networks, and competing networks drive down the costs to the consumer.

103. Yes, they drive down costs, but actually the individual consumers are probably spending far more on these applications and uses than they have ever done in the past, whether they are a new arrival into the scheme of things or like myself where you end up with more than one or two phones in your name.

(*Mr Davis*) If we look at the North American comparison, the average time per day on the telephone in North America is about five times what it is in the United Kingdom, and I have never ever met anyone in the United Kingdom who does not like to talk just as much as anyone in North America, but they have been held prisoner from talking because of high prices. As prices come down, usage goes up. I think that is best illustrated by the BT weekend price reduction which occurred on 7 December 1994. If you look at traffic over our networks and BT's networks following that huge reduction in price on weekend rates, the traffic went up so much that the revenue and margins were virtually the same following that. So the public won and the company won.

Lord Haskel

104. You told us about the 25 per cent of the people who would not be passed by cable, who would have no technology to connect them to the system. This was going to be mainly radio technology. Will they still have the same degree of interactivity, or will they be second-class citizens and not have the same facilities as the people who are passed by cable?

(*Ms Davis*) I think it is very difficult to predict precisely what is going to emerge in technology. At the moment some of the radio bandwidth is very, very high bandwidth and therefore capable of a very large degree of interactivity. I think it is worth pausing to consider what interactivity means. With interactivity generally what is required is quite a lot of bandwidth for downloading into the home, with relatively low bandwidth in the return part required for interrogating the system in order to obtain more data. So often you do not necessarily need bandwidth available to the same extent in both directions. I think that really it is very difficult to see exactly how some of this radio technology will emerge. At the moment it would appear to be more restrictive, but I think that if you look at the exact requirement for interactivity it may well be perfectly sufficient. I would also state that you cannot say that those elements of a country will never be cabled with high-bandwidth cable. Again, those costs are plummeting, and it may well become cost-effective over time. New technologies are always emerging to combine it, for example, with electricity cables or with other technologies, though frankly those technologies do not exist today. However, in five years' time maybe that will be much more appropriate. So I think it is very difficult always to predict how technology will emerge, but knowing what we know now we would certainly see that technology was sufficient interactivity for most of the applications which we envisage today will exist in competing for that work in most of the country.

105. It will not make the cable technology redundant?

(*Ms Davis*) Well .....

(*Mr Davis*) Let me add one bit which I think answers your question there. Radio works very well in areas of sparse population. Where cable has an almost unlimited capacity because of the huge bandwidth that we have and the ability to connect hundreds and thousands of customers to the cable network, radio develops problems when you get congested areas. I think that a good example of that is how many people have picked up their telephone and got a "Circuits busy" message so they could not use their telephone to make a call because too many people were using their phone. Radio is suited to less densely populated areas, whereas cable is suited to more densely populated areas, but as time goes on it should be able to go into deeper areas.

Lord Gregson

106. The defence industry's development of radio is a very good example of how far you take it. If you are in closed things like digital transmission and message comparison, you can equal cable, it is not a great problem. The thing that worries me is that all morning we have been talking about a network system which would be available. They are all LANs (local area networks) that we are talking about. We have not really yet talked about superhighway as a carrier. What are you going to put on, or what is going to be put on, superhighway and to deliver your system?

(*Mr Bates*) We are not actually talking about LANs and local area networks.

107. That is what an individual cable operator will be developing in his own area.

(*Mr Bates*) What we have now done as an industry is that we have started to link up operations all together, and that is the beginning of the superhighway. For instance, in London all of the cable operators have come together and developed, under the banner of the London Interconnect Group, an information superhighway which can connect everybody in the London area.

108. I do not call that a superhighway, I am sorry; that is an extended LAN.

(*Mr Bates*) When does an extended LAN become a superhighway? All the cable operators in the North of England have come together to form the Northern Interconnect Group. The next step to making this into a superhighway is to connect the Northern Interconnect to the Midland Interconnect to the London Interconnect, and then you have a superhighway.

109. You have a television set in a box. You are not connected to the superhighway or any other highway, are you, from that point of view? You have a large piece of capital equipment to instal which currently costs £1000 or £1200, before you can say that you can connect on a highway. That is quite separate from the television in the box.

(*Ms Davis*) I think this is the point I was making. We actually rent that equipment to customers. We will change it out as technology changes.

110. You mean the computer, the terminal?

(*Ms Davis*) No, we do not rent computers.

111. That is what we are talking about.

(*Ms Davis*) We rent modems.

(*Mr Bates*) The next generation of boxes will actually be computer driven; they will be intelligent in the same way that a computer is intelligent, so this distinction between a computer and a central box will actually come together in time.

112. Will you have a keyboard?

(*Mr Bates*) Again, one is trying to work out how to have a navigation system which my son of 11, myself and my mother of 85 can use.

113. Your son of 11 will always be able to use it!

(*Mr Bates*) Yes, you are right.

Chairman

114. How do you see the regulation of content?

(*Ms Davis*) I think this is actually one of the most difficult areas. We have talked about a lot of the technical issues, and I think history has shown us that technical people are good at solving them. If there is business there, they get there faster. The content issues are a very, very difficult problem. In the cable industry, where we have schools connected to Internet—that is why a number of us are already doing all sorts of different interconnect trials—we have actually employed gateway software which will filter out certain material going through. However, we fundamentally do not believe that it is the role of the network operator to be the policeman of the system. We think that we really are very unsuited to it. We are not trained to be censors. We are not accountable to anybody, which is pretty difficult. We therefore do not think that this is an appropriate role to have. We think this is something which needs serious debate amongst regulators and government. We would point out the sort of example from the telephone business and the telephone publishing industry when chat lines and sex lines became a real issue. Oftel really forced the industry and enabled that particular segment of the industry to form something called ICSTIS which is effectively a self-regulating body which sets its own code of behaviour for material which is allowed to go out over sex lines or chat lines. That actually has worked very well, I believe. I think it is that sort of model which needs to emerge. The difficulty is that it needs to be an international model because these content providers can exist anywhere in the world, and it is precisely that element which makes it so complicated.

Baroness Hogg

115. In effect, you were saying that you did not think you were suited for that, it is a group of network providers who are carrying out that function?

(*Ms Davis*) No, ICSTIS is a series of service providers who are self-regulating themselves about what actually goes onto their lines.

116. But agreeing with BT and with other telephone operators what will go down?

(*Ms Davis*) Not agreeing with them, but saying "These are the standards under which we will operate".

117. BT has a locus in that debate, though. You do not think you have any, do you?

(*Ms Davis*) We also participate in ICSTIS in an advisory capacity, but we are not being the censors, we are not the people who draw the line and say "That is or is not acceptable". We really are not the appropriate people to do that. Clearly you have to work with these people, because this does go over all networks, and we need to understand what is the acceptable material and what is not, but we should not be the people setting those standards.

Chairman

118. It is a difficult problem. The analogy might be the postal system. In a sense, anybody can send anything over the post, can they not?

Chairman *contd.*]

(*Ms Davis*) Yes.

(*Mr Davis*) If, however, you or some regulatory body were to enact a standard and then tell us that we were to implement a given software or a given product to help enforce that standard, that is different, and that is a technology which we can address. We just do not want to address the human issue of making a decision over what is coming and going or not coming and going.

119. Meanwhile there are different national positions being taken, such as the German position that service providers are responsible.

(*Mr Davis*) Which is very much like the telephone position here in the United Kingdom.

Lord Gregson

120. The problem is that these systems can be hacked. America is absolutely incredible, in that you can buy hacking information, the magazines actually advertise it—"If you want to hack into the Pentagon send your donation and we'll send you all the information"!

(*Ms Davis*) Exactly, which is why we believe the solution must be that we have to be sensible about it.

Lord Gregson] You can buy black boxes in Holland for a tenth of the price.

Chairman

121. Time is defeating us yet again. May I say how much I at least have enjoyed listening to your evidence and the evidence of your human interactivity. Could I ask you this question at the end—and we do not have much time for you to reply, but maybe you would like to write to us. The Committee feels that in this wide-ranging subject we should perhaps be focusing on what are the barriers to development of a true international superhighway. Do you have a quick reaction to that, and would you like to contemplate a longer reaction to it?

(*Mr Davis*) I think we would like to contemplate a longer reaction, but just looking at it on the surface, we see a situation now where, from the network point of view, the technology is here to do anything from the interactive point of view that any service provider comes up with, so the barriers to those software service providers are an interface bit on the end of the network which will allow them then to accomplish what they wish with their software. Companies like Nintendo and the other games companies are addressing that by broadening their product so that it will be able to act as a kind of intermediary for those other non-games services as well. That touches the point Alan raised about our intelligence set-top boxes which are coming with the next generation probably in 1997 and will be much more beneficial for use there. To us, though, the big area now is software. The Internet is available today, and people are developing products for the Internet. What we see is those products working much more usefully in a much quicker timeframe, being much more responsive and much more interactive over our broadband cable networks. The networks are ready today, and I think the barriers are falling quickly.

Baroness Hogg

122. On that same issue, do you see problems, as far as service providers are concerned, in terms of the price at which they can get through to the customer through the network provider? Are there barriers to development there?

(*Mr Davis*) I do not think that there are in that sense.

123. I am not asking you if you are over-charging, but more generally.

(*Mr Davis*) I guess that that eventually touches on the point of open access or something of that nature. There again, competition is working well, and those who are developing the quality products are having those quality products carried on the networks and are being paid for by subscribers who want to use those services. So it is really a question of the provider developing those quality products and then there is an audience for them. I do not think access is a problem. We all are scrambling for as much product as we can possibly get to deliver into the home.

Chairman] Mr Davis, Mr Bates, Ms Davis, thank you very much indeed.

Supplementary Memorandum by the Cable Communications Association

The Cable Communications Association ("CCA") submitted a memorandum to the House of Lords Science and Technology Committee on 5 February and subsequently gave oral evidence before the Committee on 13 February. This paper is submitted in response to a request from the Committee for additional information on the barriers to the development of a true international superhighway.

As we stated in our original submission, the CCA believe that Britain is leading the world in the development of the broadband infrastructure which will form the back-bone of the "information superhighway" in the UK. Cable operators are deploying an optical fibre network across Britain which passes over six million homes today and by 2001 will have passed approximately 17 million of the 22 million homes in the UK. In our original submission, we also pointed out that we do not believe that the "Information Superhighway" will be constructed by one individual operator. Indeed, this is a view that has now been endorsed by Sir Peter Bonfield, chief executive of British Telecom, who has stated that "The idea of a single fibre-optic network to every household is wrong." Instead he envisaged "a growing patchwork of links between different systems that would evolve at different paces in different places, using mixed technology".[1]

1. Liberalisation and Ending of Monopoly Rights

The CCA believe that Britain's lead in network infrastructure has come about as a direct result of the liberalisation policies that have been pursued by the government over the last decade and which started with the privatisation of BT in 1984. These policies have resulted today in an environment which has enabled companies to enter the market and to commit significant funds for the development of advanced communications infrastructure. Indeed, over 150 PTO licences have now been awarded in the UK which in turn have brought about lower charges, higher quality of service and the introduction of new, innovative services. We strongly believe that this plurality of operators is vital to ensuring the full development of an "information superhighway" as monopoly providers have historically shown little inclination to deliver such benefits.

The CCA would therefore argue that one of the most fundamental criteria for the development of the global information superhighway will be the ending of monopoly rights and state owned national telecommunications operators.

In December 1993, the European Council requested that a report be prepared on the "specific measures to be taken into consideration by the Community and the Member States for the infrastructures in the sphere of information". To write this report, the Commission established the High Level Group on the Information Society, under the chairmanship of the industry commissioner Martin Bangemann. The Group was composed of 19 industrialists from Europe's biggest electronics and media firms, but excluded the public telephone companies (PTTs). In its report[2] the Group "recommend Member States to accelerate the ongoing process of liberalisation of the telecom section by . . . opening up to competition infrastructures and services still in the monopoly area".

The European Commission certainly seem to have recognised the importance of such a move and recently adopted a Directive which will remove restrictions on cable networks[3] for the provision of those telecommunications services that have already been liberalised from 1 January 1996, and are expected to adopt, very soon, a similar Directive in respect of other alternative infrastructure.[4] This is to be followed by full liberalisation of all services and infrastructure from 1st January 1998.[5]

On a global scale, the same principle of liberalisation was recognised as a key element for the development of information superhighways at the G7 Ministerial Conference held in Brussels on 25 and 26 February 1995. During this summit, the G7 countries and the European Commission resolved to collaborate on the basis of eight core principles in order to realise their common vision of the global information superhighway. These principles included promoting dynamic competition, encouraging private investment and defining an adaptable regulatory framework.

A key step in dismantling the barriers to a truly international information superhighway would be the ending of the system of artificial "accounting rates" for cross-border telecommunications traffic. These rates, which are agreed through correspondent relationships by operators which are still typically monopolists in their domestic markets, bear little or no relationship to the true costs of conveying such traffic. The result is that international calls are typically priced far above the level of national calls covering the same geographical distance, causing the smooth flow of telecommunications traffic on the superhighway to be grossly distorted at international borders.

As mentioned above, the CCA is hopeful that accelerating moves towards liberalisation of telecommunications over alternative networks within the European Union (including internal EU cross-border traffic) may prompt more countries, including the UK, to move more rapidly to full international facilities liberalisation.

2. A Stable Regulatory Framework

To date, UK cable operators have invested over £5 billion of private capital to construct their fibre-based networks and this figure is expected to reach some £12 billion by the end of this decade. The decision to invest these huge sums was taken on the basis of a clear and stable regulatory framework which acknowledges the difficulties that new entrants face when entering a market dominated by an incumbent operator. The CCA estimate that a potential £50 billion of investment will be required for cable operators in mainland Europe to build networks or, where it already exists, to upgrade existing infrastructure to two-way broadband capacity.

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[1] *The Times*, 9 February 1996, Page 21.

[2] High Level Group on the Information Society *Europe and the global information society: Recommendations to the European Council* 26 May 1994.

[3] Commission Directive 95/51 amending Directive 90/388/EEC with regard to the abolition of the restrictions on the use of cable television networks for the provision of already liberalised telecommunications services, OJ No L 256, p.49, 26 October 1995.

[4] Draft Commission Directive amending Commission Directive 90/388/EEC regarding the implementation of full competition in telecommunications markets.

[5] Council Resolution of 22 December 1994 on the principles and timetable for the liberalisation of telecommunications infrastructures, OJ No C 379, 31 December 1994.

The CCA therefore believe that if the broadband networks in other countries are to be constructed under a liberalisation process as advocated above, consideration will need to be given to ensure, as far as possible, that regulatory frameworks are developed that recognise this need for stability.

This point was endorsed by the High Level Group on the Information Society, referred to above, who recommended to the European Council that they develop:

> "a proper regulatory framework designed to achieve:
>
> — market regulation to enable and to protect competition;
>
> — a predictable environment to make possible strategic planning and investment."

3. TECHNICAL STANDARDS

The CCA stated during our oral evidence before the Committee, that we do not feel that a lack of technical standards is the real inhibitor to growth of the information superhighway. We do feel however, that this is an area which will need to be addressed in the global arena. We noted in our original submission that open and internationally agreed standards are required if this industry is to develop in a way which encourages competitive supply of services and good customer choice and value.

The CCA do believe, however, as we have stressed to the Committee previously, that the industry itself is best positioned to set standards. Historically, government has not been particularly successful in setting standards, due to the fact that commercial factors take an important part in the development of new products and services. One such failure was an attempt by the European Commission to set the D2-MAC standards for television signals, which was seen as an interim technology by industry and therefore never came to fruition.

There are several industry fora which are addressing the formulation of standards relevant to networks, equipment and services for a future international superhighway. Probably the most significant and wide ranging on these is DAVIC (the Digital Audio Video Council) which is an international group set up two years ago to propose a set of specifications to established standards bodies such as the ITU (International Telecommunications Union) and ISO (International Standards Organisation).This group has just recently produced the first version of such a specification which addresses many of the standardisation issues required for equipment compatibility and network interoperability.

Another important group, especially for cable networks, is the IEEE (Institution of Electrical and Electronic Engineers) which is the US based professional body. It organises a series of working groups which address new standards, and the IEEE802.14 group is involved with the standardisation of high speed data modems used on cable networks.

Finally, there is the DVB (Digital Video Broadcasting Group), organised under the auspices of the European Broadcasting Union. This group has been very successful in proposing standards for digital broadcast television over satellite, cable and terrestrial networks. Specifications produced by the DVB have now been adopted and approved by ETSI (European Telecommunications Standards Institute). This group has, over the last year, extended its brief to include interactive digital services associated with broadcasting.

The target of these groups is to have their proposed specifications accepted by the European or international standards bodies such as ETSI, ITU and ISO. Only then will they generally be accepted and adopted by all manufacturers and network operators.

4. DEVELOPMENT OF SERVICES

The development of products and services will obviously be a key factor in the advancement of an international superhighway. As demand for and awareness of services increases, network operators will have the necessary incentive to build and up-grade their networks in those areas which do not currently have broadband capacity.

However, as the CCA stated during our oral evidence before the Committee, we do not believe that there will be one single application that will drive this process forward. Many trials are taking place both here in the UK and indeed world-wide, to assess those services which will be most attractive to consumers and to test some of the software and consumer equipment that will be needed to deliver these services.

On an international basis, the G7 Partners have also indentified and undertaken a series of pilot projects which will be undertaken in partnership with industry aimed at demonstrating the potential of the information society and stimulate its deployment. Annex 1 describes the proposed themes to be undertaken by the G7 Partners.

5. CONCLUSION

As we hope we have outlined above, the CCA believe that most of the key considerations for the development of an international superhighway are currently being addressed both by government and industry. In response to European Commission proposals, the CCA have urged the Commission to encourage Member States to effect the processes of liberalisation ahead of the 1998 deadline, as we believe this represents a significant milestone in the development of broadband infrastructure, which in turn will spur on the development of applications and services.

The final, and perhaps most important, element to this whole debate is therefore to increase awareness of the benefits that the "information superhighway" will bring to business, schools, hospitals, government and indeed individual consumers and to allay the fears that are often associated with new technology.

ANNEX 1

G7 PILOT PROJECTS

The following are a description of the proposed themes selected for initial implementation by the G7 members along with the European Commission;

(i) Global inventory; to create and provide an electronically accessible multimedia inventory of information regarding major national and international projects and studies relevant to the promotion and to the development of the global information society. An assessment of social economical and cultural factors impacting on its development will also be undertaken.

(ii) Global interoperability for broadband networks; to facilitate the establishment of international links between the various high-speed networks and test beds supporting advanced applications.

(iii) Cross-cultural training and education; to provide innovative approaches to language learning in particular for students and for SMEs.

(iv) Electronic libraries; to constitute from existing digitisation programmes a large distributed virtual collection of knowledge of mankind, available to a large public, via networks. This includes a clear perspective towards the establishment of the global electronic library network which interconnects local electronic libraries.

(v) Electronic museums and galleries; to accelerate the multimedia digitisation of collections and to ensure their accessibility to the public and as a learning resource for schools and universities.

(vi) Environment and natural resource management; to increase the electronic linkage and integration of distributed databases of information relevant to the environment.

(vii) Global emergency management; to encourage the development of a global management information network to enhance the management of emergency response situations, risks and knowledge.

(viii) Government on-line; to exchange experience and best practice on the use of on-line information technology by administrations on the establishment of procedures for conducting electronic administration business between governments, companies and citizens.

(ix) Global market-place for SMEs; to contribute to the development of an environment for open and non-disciminatory exchange of information and to demonstrate, particularly through electronic data interchange (EDI), the interoperability of electronic and information co-operation and trading services on a global scale, for the benefit of SMEs.

(x) Maritime information systems; to integrate and enhance environmental protection and industrial competitiveness for all maritime activities by means of information and communication technologies including applications in the area of safety and the environment, intelligent manufacturing and logistics networks.

TUESDAY 27 FEBRUARY 1996

Present:

Butterworth, L.	Hollick, L.
Craig of Radley, L.	Phillips of Ellesmere, L. (Chairman)
Flowers, L.	
Gregson, L.	
Haskel, L.	Gerard, L.
Hogg, B.	

Memorandum by the Association for Information Management (Aslib)

1. Pre-eminence

The information superhighway and the content thereof is arguably the most important new resource for economic and social development in the global infrastructure.

2. UK Advantages

The United Kingdom has distinct advantages including, most importantly, the English language, telecommunications deregulation, information management leadership in Europe, a long-standing information rich culture and a major capital market.

3. UK Weaknesses

The United Kingdom is not recognising its importance or fully exploiting its advantages and will be caught up, and possibly overtaken, by other EU nations, particularly following telecoms deregulation in Europe after 1998 and also by emerging third world countries. The gap between the United Kingdom and the United States and, for that matter, the EU and the United States, is expected to widen.

British firms who want to develop Web products and services will face fierce competition from around the world. Many countries share our command of English, the Web's lingua franca, and they will seek to control the most profitable niche markets. Tomorrow's media moguls will be clever enough to beat the present players. Britain could leak money through the Net if we do not succeed in building a positive balance of Web payments. The real issues are about the electronic economy and jobs and trade balances and market mechanisms that will give the UK a true edge against the world.

4. Observations

(i) *Government Leadership*

In the United States the Government has acknowledged the overriding importance of the information superhighway to the US economy at the highest level (Clinton/Gore). This enthusiasm, which they have exported very successfully, has been followed up by impressive action. For example, Government-owned information is offered free of charge, and copyright waived on the Internet. This is arguably the most important reason for the extension of the USA's lead in the electronic information industry. The US Government has convened an advisory working party representing wide interests, particularly in the area of content. In fact an American member of Aslib sits on the Committee.

The US Government has an impressive list of objectives including the wiring up of all schools to the information superhighway, promoting private sector investment, promoting technology innovation and new applications, ensuring information security and network reliability and coordinating with other levels of Government and other bodies.

The UK Government appears to have adopted a laissez faire approach disguised as a market-driven policy.

The European Union has tracked the US initiative as shown by the Bangemann and Delors reports. However, the EU champions broadband at the expense of the Internet and this is a significant, contributory factor to the Internet content being 80 per cent from the US and growing.

(ii) *Promoting Investment*

Traditionally Britain has turned its real property into a resource for wealth. Tax breaks and other incentives in the UK can make intellectual property an equally attractive business in the emerging economy of the next century. In the City we could establish a new bourse to trade in intellectual properties, and that will mean standard and approved methods for valuing them. In turn, they could produce more balance sheet assets for our electronic publishing enterprises which thereby will find it easier to raise capital for new ventures.

(iii) *Content Stimulation by Government*

UK Government ministries and agencies are using information superhighway content opportunities insufficiently in their role of encouraging the community to use information and thereby the information infrastructure. For example, Aslib's national awareness and information role (NAP) for the EU Commission, in which we encourage SMEs (over 95 per cent of UK businesses) in the usage of electronic information, is hampered by the UK Government's concentration on technology and not content. The Technology Foresight Programme is an example of this.

(iv) *For the Common Good*

It is imperative that the Government ensures by encouragement or facilitation that access to electronic information is convenient and tailored to the needs of all citizens to protect against the division of our society into "haves" and "have nots", and that those citizens who will have difficulty in taking advantage of the information superhighway are not disadvantaged ethically or illegally by more powerful groups.

Aslib's Review of the Public Library Service in England and Wales for the Department of National Heritage recommended that public libraries be wired to expert hubs in order to provide access for the citizen to the global information infrastructure, and which would also ensure that services for the common good are promoted. However, the idea has so far been cold shouldered.

(v) *Support for the UK Economy and Access to Information*

UK organisations are in the absurd position of having better access to foreign governmental information, especially to that in the USA, than to comparable UK data. This vital corporate decision making resource is only available from the UK in hard copy or CD-ROM at great cost. A positive action by the UK Government in this area could well reduce the USA's lead in the electronic information industry.

(vi) *Support for UK Workers*

UK support for the academic community is out of balance with the country's economic interests. JANET and SuperJANET have proved to be excellent initiatives but with scant consideration given to the use UK companies could make of these networks.

(vii) *Regulation and Legislation*

The Government should address the regulation and possible legislation, certainly in the short term, of the legal issues of the authenticity of signatures, legality of payments, prevention of fraud and other legal and security issues such as retention of intellectual property rights.

(viii) *Standards*

Government should take the initiative in encouraging standardisation and improving the uniformity of data available at a regional and local government level.

There is a lack of common standards for cataloguing, interchange codes, protocols, character sets, symbol sets and search and retrieval algorithms. The delivery systems, encodings, addresses and access points should be created to a common, intelligible standard.

However, there are concerns also that traditional Government actions in the areas of law, taxation and censorship may restrict the flow of information that is an integral benefit of the information superhighway.

(ix) *Employment*

Many public and private sector organisations are creating "virtual" knowledge centres to replace traditional physical facilities with dual advantages of cost reductions and exploitation of the new technologies and their content. This will create physical, social and economic disruption which must be tackled with government leadership.

(x) *Training and Education*

Societies with a younger age profile such as some of the emerging third world countries have a distinct advantage over the more mature societies in that more of their people possess a knowledge and competency, beginning with computer literacy, to benefit from an information superhighway.

Government should seek and encourage partnerships and where appropriate provide pump priming monies to raise the required investment to improve the educational infrastructure including the expansion of information content and IT in the national curriculum, and in opportunities for life-long learning.

(xi) *Information is more Important than Technology*

There is cause for concern that the orientation of the questions outlined in the call for evidence refer to the development of UK software and the dominance of US software when, in fact, information is more important and the Government should be encouraging UK content.

Examination of Witnesses

MR R BOWES, Chief Executive, Aslib, MISS G DODD, Software Services Manager, Roehampton Institute, and PROFESSOR C OPPENHEIM, Professor of Electronic Library Research, De Montfort University, Milton Keynes, the Association for Information Management (Aslib), called in and examined.

Chairman

124. Good morning, Mr Bowes, Miss Dodd and Professor Oppenheim. Perhaps you would like to introduce yourself and your colleagues, Mr Bowes, and then make any introductory remarks which you would like to make?

(*Mr Bowes*) Yes. I am the Chief Executive of Aslib, the Association for Information Management. On my left is Georgina Dodd who is the Software Services Manager at Roehampton Institute, London. On my right is Professor Charles Oppenheim who is Professor of Electronic Library Research at De Montfort University.

125. Thank you. Do you have any introductory remarks you would like to make?

(*Mr Bowes*) Yes, I would like to say to the Committee that Aslib is an information management association of some 70 years' standing. We are worldwide and we are a corporate membership body with five business divisions. We are very much information-content led rather than technology driven. We are the national awareness partners for the European Commission for England and Wales, with the task of implementing electronic data collection and usage by SMEs (that is, small and medium enterprises). That is quite a substantive task, because some 90 per cent of British and European businesses are SMEs and have less than 20 employees, so we have a real communications challenge ahead of us. We are delighted to be here today, and we are delighted with the possible questions which you have raised for Aslib, because without being patronising, my Lord Chairman, we feel that they reflect the point we made in our original submission; that is, that the content is as important as technology.

126. Thank you very much for that. Perhaps we could begin with that point. We have heard a good deal about the distinctions to be made between the network providers, the service providers and the content. I wonder whether you would like to say a few introductory words on the point which you have just made that of these three content is the critically important issue?

(*Mr Bowes*) Yes. There are a number of ways of looking at it, but one of them is that technology is going to be driven very strongly by the private sector anyway. The point about content is that it has been taken on board very much by, for example, the United States at a top level, from government level down. We believe that the importance of content as the essential element—because the other two are hopeless and irrelevant without content—has not been given the priority that it should have, not only by the United Kingdom Government but by the European Union as well. We have made this point to the European Union, and we are confident that they will address it in the new Information 2000.[1] [2]

127. One can see from the interest of some owners of content and their involvement, say, in the cable companies that it is possible to have a fairly restricted commercial view of content—like old films, for example. How do you define the content which is going to be most important on the superhighway?

(*Mr Bowes*) I think the best way of putting it is, to take for example, the mission as described by the United States Government in its National Information Infrastructure and Task Force. Their mission is that all Americans have a stake in the construction of an advanced national information superstructure; it will develop and deploy the

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[1] See Endnote 1.

[2] See Endnote 2.

Chairman *contd.*]

infrastructure as it is today, but nevertheless there remain essential roles for government. It can create jobs, spur growth, foster technological leadership. It can deliver higher-quality, lower-cost government services. It can prepare, as they say, "our children for the fast-paced workplace of the 21st century and build a more open and participatory democracy at all levels of government". They are talking there about content—that is, information needed in our everyday lives, in our work and in the way we conduct our lives, and in our relationship with government. I think you could describe it this way: that there will be new neighbourhoods set up; your neighbour of choice may not be the person sitting next to you but could be the person somewhere else in the world who actually has the same objectives as yourself, the same concerns, the same problems, linked electronically. Whole new structures of neighbourhoods will be developed in the world. That is why content is very important.

Lord Flowers

128. This is going a bit off at a tangent, I know. I am slightly bothered about your concept of what a library is in the electronic age, because you say in your evidence, under "For the Common Good", that "public libraries be wired to expert hubs in order to provide access for the citizen to the global information infrastructure". Is not this a rather massive step backwards? Is it not the equivalent in electronic terms of providing public baths?

(*Mr Bowes*) I would respectfully disagree. I think it is a massive step forward, my Lord Chairman, on the basis that they would provide the interface between the citizen and the global information infrastructure, therefore they would provide the interface of professional advice and help to those seeking information through the Public Library Service. We have suggested the Public Library Service. It could be community centres. The point is that people need an interface, people will need help in assisting them to gain the information they require as opposed to getting lost amongst the jungle of information.

129. But the whole concept of superhighway which one sees in primitive form in the Internet is that you find what you want by your own labour.

(*Mr Bowes*) We believe that will naturally happen over many years, but in, say, the shorter term, the next 20 years, you would have a few "haves" and many "have nots" who would not be able to find their way through the information which is on the superstructure.

Baroness Hogg

130. May I press you a little further on this definition of content when you referred back to the United States mission statement? In fact, that was a bundle of objectives in which infrastructure was featuring quite strongly, was it not?

(*Mr Bowes*) Yes.

131. So it did not seem to me to be quite so entirely focused on content as you were suggesting. If one looks at a tripartite or three-stage added-value change of content, kind of publishing function and delivery through an infrastructure, a lot of the things you are describing seem to me to fall into the second or third. Navigational aids, for example, seem to me in some sense to be a kind of publishing function. Could I therefore reprise the question. What is this content that you think is going to be the most important, delivered through publishing functions with the aid of navigational systems, through a delivered infrastructure? What is the content element which you think is going to be the most important?

(*Mr Bowes*) One of the areas of content will be government information at a local, national and international level. The biggest web site in the United States is the United States Inland Revenue Service and that is providing a very satisfactory service to both the citizen and for the government in terms of information, cost reduction and efficiencies. Business content is about business information from databanks. All sorts of information to make our businesses more competitive or to make you, as an individual, more competitive. That is why we were rather concerned that your questions included the statement, "is the Internet important"[3]. The Internet is very important to us because it is full of content, full of information. If as at the moment, 85 per cent is American information, then as the world goes to the Internet to find out sources for trade, licences, partnerships and information making them more competitive, they will see an array of United States information, an array of United States companies, United States-controlled databases, etc. That is why it is important to Britain.[4] [5]

132. So business information from the Internet rather than educational material or entertainment material?

(*Professor Oppenheim*) The same applies to all of them.

(*Mr Bowes*) I am not isolating that at all. At Aslib we have just launched a distance-learning package that will go on to the Internet and enable us economically to be able to reach anyone in the world at very low cost with training and education. So it is very important for training and education as well.

Lord Haskel

133. I would like to probe a bit further the nature of this information. You were talking about the value to business. Are you suggesting that business should have their catalogues on the Internet, their products, their services, the things they are looking for, their needs? If so, how are you going to be sure that your customers or the people who need these products are going to access all this information? Is there going to be some kind of way in which it is going to be categorised? For instance, if I am looking for plumbing equipment, are you proposing that there should be some sort of catalogue of plumbing equipment or something of this nature?

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[3] See Endnote 3.

[4] See Endnote 4.

[5] See Endnote 5.

Lord Haskel *contd.*]

(*Professor Oppenheim*) There are two sides to that. First of all, you can index the material, catalogue the material.

134. But who would index it?

(*Professor Oppenheim*) At the moment such indexing is done semi-automatically by computers and it is not very satisfactory. To return to Lord Flowers' question, are we going back to public baths by suggesting there be intermediaries such as librarians and interfacing, the whole point is that it is extraordinarily difficult to find information with the current generation of cataloguing and indexing tools that are available. It is slow, it is tiresome and very often extremely inefficient because it is primarily computer-generated. What we are suggesting is that there should be intermediaries to assist precisely in the way you suggest and it will be at least 20 years, maybe longer, until the computerised automatic indexing systems really come to fruition.[6]

Lord Gregson

135. The United Kingdom has the best, widest public information service in the world, of all the nations that I know of. It is called the Citizen's Advice Bureau, which is the largest public information service that exists anywhere in the world and it works extremely well. If you have ever worked in a CAB you will realise that most ordinary citizens want a lot of help to find information and they get it at the moment. So there is no shortage of help in this direction from that point of view; it already exists. It need not be electronic from that point of view. I agree it would be much easier if there were a massive system properly indexed, but you are not starting from scratch by any means. You are starting from a very well developed system which works rather well, and if you realise how much help these people want—and it is not just old people, it is young people as well who are supposed to be computer-literate—they really do need to be helped a great deal. There is not a cat in hell's chance that they would ever find their way through the index of an electronic system. So, for example, what is the most important—the help or the system?

(*Mr Bowes*) The help, and that is why we have that other advantage, an excellent public library service, in this country.

136. But you have a much better system in the CAB. It is much more extensive, about ten times more extensive, than the public libraries, and very well staffed, of course?

(*Mr Bowes*) The importance of public libraries, though, is that two-thirds of the population uses them already. Two-thirds of the population does not use Citizen's Advice Bureaux.

137. I assure you it is a very widespread system.

(*Professor Oppenheim*) We are not dismissing the CABs in any way. We think they have a very important role.

Lord Craig of Radley

138. Content, as you have explained to us, is very important but how does one ensure that the quality of the content is satisfactory and how does the customer identify what is good-quality content or poor-quality or just a one-off wild idea of somebody? Perhaps you could comment on that?

(*Miss Dodd*) I think this is another aspect where citizens inevitably need help, and be it from public libraries or Citizen's Advice Bureaux, they have to learn, as it were, to make an evaluation, to balance up what is useful and what is not. Current management writing forecasts a society where 20 per cent are information-literate, information experts. That leaves an awful lot who are not and what we need to do is bring these things together so that we are providing content, the sort of content that people get from Citizen's Advice Bureaux, "What do I do if my granny is ill?" That is what people need to know. But businesses also need to know what services are provided to all the ailing grannies to be able to see this as a market to provide a service for, and by providing an infrastructure that will bring all this together we should be able to provide the benefits to citizens that they need. They will need a lot of training, they will need a lot of education. My own experience is that the most amazingly unlikely are incredibly adept in front of a keyboard or screen but there is also a big gap of the computer-illiterate through their mid to late 20s into their late 30s, and they are going to be with us for a long time. We need to provide something for them as well, not just that they have individually but that they will be able to go somewhere in the community and tap into the infrastructure, get the sort of advice and guidance they need. We have seen this in the publishing world. The hard copy publishing world raises standards overall. People stop looking at sites that are not useful and, therefore, the providers, because no-one is using what they are providing, upgrade it and adapt it to what people actually want.

Lord Hollick

139. What you seem to be saying is that there is a role for an intermediary, somebody who can vet the quality of the information, who can provide a navigation system that is appropriate to that database and who can probably provide a helpline as well. Who are these intermediaries? Do they exist already?

(*Mr Bowes*) We have information professionals in this country. The Association for Information Management's membership principally are professionals who provide navigation for their companies for information, but I would like to add, if I may, an additional point and that is that we believe there is not enough content because there is not enough focus by the government on this area, that there is not enough investment in this country. We should be supporting the entrepreneurs, content providers, that is, with seed money, with investment to facilitate the encouragement of more content. Also most of the initiatives taken by the Government have been vertical and they are about technology, so we have the Office of Science and Technology with the

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[6] See Endnote 6.

Lord Hollick *contd.*]

Technology Foresight programme which is very much technology driven. We then have the DTI with the Information Society. Again, they have used as their lead body the FEI which is very much the big guns, if you like—the IBMs and the British Telecoms—not the users or the content suppliers. Then we have on the other hand the Department of National Heritage, which is another vertical structure, with the Library and Information Commission. We need something which is horizontal across government departments and across all sectors of interest. That is what this country is crying out for. I am sorry to keep referring back to them, but the United States Information Infrastructure Task Force has members—indeed, it has an Aslib member sitting on it—representing all interests, all sectors and all government areas. I think that is why they are moving ahead, and that is one reason why 85 per cent of the content—Internet content—is now American.

Baroness Hogg

140. We seem to have moved on naturally to the question of what are the main barriers you see to the development of content provision in the United Kingdom. I am still a little unclear whether what you see as the main barrier is at this intermediary level so that the organisations, businesses and massive numbers of different sources of information in this country can be published, if you like, effectively to the final user; or whether it is the content providers themselves. I absolutely understand your focus on government, but could we also talk about the private content provision and what the inhibitions or barriers are to that being effectively published and delivered in the United Kingdom?

(*Mr Bowes*) I know we have been talking about government a lot, but it is very important that the initiative and the message comes from the top, as in any business. It is destructive when the European Union Government and United Kingdom Government say that broad-band is important, technology is important, but the Internet is not that important. It discourages organisations from knowing that there is a market out there for their information products. The other barrier comes back to where we are today. We have a head start in terms of telecoms deregulation, in terms of the English language, etcetera, etcetera, but it is going to be whittled away very fast indeed. Already English-speaking countries like India are providing huge amounts of content to the databases around the world. We should be creating partnerships with these countries, alliances with organisations in India, Canada, wherever, in order to provide 24-hour information content provision, before they actually run ahead of us and overtake us.

(*Professor Oppenheim*) I think there are other barriers as well. There is a lack of investment, there is no question about it, and a lack of entrepreneurial risk-taking in terms of content providers getting into this business. Part of the problem lies in our existing venture capital organisations where they do not really particularly understand electronic information and are a bit nervous of putting in money. That is why—and I know we keep harping back to government—we do genuinely believe that Government has an active role to play as opposed to letting the market decide. We believe that the Government should underwrite such investment so that the venture capital organisations and banks are more willing to invest in this very important new area. So that too we regard as a barrier, and we can see possible mechanisms which are available for overcoming that barrier.

(*Mr Bowes*) This is as important for industry in the future as manufacturing is today, and yet it is not considered as an investment opportunity.

141. What support is given in the United States to private investment content provision?

(*Professor Oppenheim*) In the United States venture capital organisations and banks are much more willing to invest, and I do not see much more need for the government to get involved, because they seem to recognise that electronic information is a valid thing in which to invest. So there is indeed a problem of educating the venture capital and banking sectors as to the importance of this area as well. That seems somehow to have been achieved in the United States, which is not the case in this country.

(*Mr Bowes*) I think that one of the reasons why that has been achieved is that again, in reading their task force objectives, they are stating practical objectives which they are going to achieve. That means a market place. They are saying, "We're going to link up all the schools, we're going to link up all the community centres, we're going to link everything up." That is a market, so that venture capitalists and banks will see that as a market opportunity. If we do not say these things here, then people will not invest. They will go to a service industry and invest in that.

Lord Flowers

142. I want to follow on from that, if I may. What role can the Government actually play, apart from being enthusiastic and declaring that it is an information age and so on (and I agree that that is important)? The Government can, of course, set a good example and put lots of information on the system. It is doing that—slowly, but it is doing it. What else can it do to encourage others to do sensible things, to persuade others to invent appropriate search engines for particular purposes and that kind of thing? Is there any future in thinking about a technology foresight programme devoted to this kind of thing—'Content Foresight' or whatever you want to call it?

(*Mr Bowes*) We were very excited, if I may say so, by that response from the panel where it was suggested that maybe we should have a content foresight initiative. Yes, without a shadow of doubt. I would suggest, though, that it has to be cross-governmental; it should not be run by one government department. Yes, that would be wonderful. The Government should create a set of objectives which it wants to achieve within a certain timeframe. If we do that and there is an opportunity for everyone to talk together and plan the future with objectives, instead of its being driven by a few major

Lord Flowers *contd.*]

technological companies, that would be a major step forward.

143. What kind of objectives can you see coming out?
(*Mr Bowes*) All the ones in the mission statement of the United States Government Information Infrastructure Task Force,[7] for a start. Anybody can download them, but I have them here. Their objectives are wonderful. I listened to a French minister the other day. He complained that "Governments"—he was talking of his government—"are worried about the information revolution. We don't know what to do." What the Americans have said is, "We are going to take the initiative." They may be making it into a political point for themselves, but that is another matter. They have said, "We will deal with this, we say that it's the opportunity for American companies to win." They use the words "American companies to win". I have never seen that anywhere in the European Union or in Britain. Nobody has said that, but they say "to win". I think that is what it is about.

Baroness Hogg

144. It seems to me to be a phrase I have read almost too many times in the Competitiveness White Paper, but never mind!
(*Mr Bowes*) So yes, I think a content task force or whatever it is called, a foresight programme, would be excellent.

Lord Flowers

145. This is where I get a trifle confused by your statement of library objectives in this area. If one did have a content foresight programme which would reward people for putting up good suggestions by backing them with money, it does not necessarily follow that those people would be libraries?
(*Mr Bowes*) No, absolutely not.

146. Would there then not be some kind of conflict with your image of a library?
(*Mr Bowes*) Absolutely not, your Lordship.

147. Why not?
(*Mr Bowes*) Because it is going to be such an all-embracing environment, the information superhighway of the future, that we simply will be using every advantage we have, which will be libraries, it will be chambers of commerce, it will be trade associations, it will be community centres. We need to use them all, not do what our government and the European Union have said so far, "We will foster that area but not that area." That is faulty thinking. We must use them all.

Lord Hollick

148. I do not in any way wish to diminish the value of exhortation, but are there any concrete government policies that you think should be introduced?
(*Mr Bowes*) The foresight forum would be a concrete decision.

149. What would its remit be?
(*Mr Bowes*) Its remit would be to ensure that the United Kingdom is at the leading edge of the global information infrastructure of the future.

Lord Haskel

150. There is, for instance, a government loan guarantee scheme which can help small businesses and their finance. Is that the kind of thing you would like to see used to encourage this?
(*Mr Bowes*) Yes.

151. The point is that there is no shortage of schemes and probably no shortage of money. The problem seems to be to get people to take them up?
(*Mr Bowes*) Loan guarantee schemes are dependent upon banks providing capital. Banks do not provide capital to small start-ups today. If we had an initiative from the top, as we have described, all these schemes you referred to would fall into place. At the moment they are not falling into place because there is no focused objective.

Lord Gregson

152. In your opening statement you mentioned that content is important because it has to be developed and that technology would be taken care of by the private sector, but that is not the history. The history of the private sector taking care of technological development is a muddle. It is a history of muddle and campaigns to create different standards for competitive reasons, which meant, of course, that it took ten years to sort out the standards for video. We started out with it introduced in the United Kingdom and the Japanese took it up but they fell out amongst themselves and so we finished up with two different sets of equipment. So do you not think there is a need for there to be a steer on the development of equipment?
(*Mr Bowes*) Yes.

153. You are suggesting in your paper it is not important because it will take care of itself but the history is that it does not take care of itself, does it?
(*Mr Bowes*) I am sorry, I was saying the technical move forward is very powerful in the hands of private industry. In our paper to you we have suggested that the government look at standards, regulation, legislation, those aspects, in order that the technological drive is in the right direction.

154. There is a need for some work to be done?
(*Mr Bowes*) Yes. We have made that point before.

155. You gave the opposite impression, in fact.
(*Mr Bowes*) I beg your pardon.

Lord Butterworth

156. I wonder if I can draw your attention to a sentence in your document because it highlights the confusion that I now have. It is paragraph 4(i) at the end: "The European Union has tracked the US initiative as shown by the Bangemann and Delors

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[7] See Endnote 7.

Lord Butterworth *contd.*]

reports. However, the EU champions broadband at the expense of the Internet and this is a significant contributory factor to the Internet content being 80% from the US and growing." "EU champions broadband at the expense of the Internet": I did not fully understand that, I am afraid.

(*Mr Bowes*) In a sense it was picked up by the questions that you played back to us when you said: "If broadband networks are likely to be more use to industry, academia, the NHS ... does it matter if content on the Internet is largely dominated by the USA?" We are suggesting that is actually the view.

157. You answered that earlier, of course, but what is it that the European Union has done? How has it championed broadband in a way that stifles the Internet?

(*Mr Bowes*) By making the broadband link between capitals of the European Union a prime objective. In our discussions with the European Community it is very difficult to discuss the Internet. They are not championing the Internet, whereas they are championing broadband between the capital cities which is fine, but in the United States they are championing both broadband and ISDN and the Internet. So the Internet is really being ignored and that is why 85 per cent. rising is now American content.

Baroness Hogg

158. But is not that slightly chalk and cheese? Is not band width rather important to effective use of any network?

(*Mr Bowes*) Absolutely, yes. It is essential to have it.

159. So I do not quite see the conflict here which you are describing?

(*Mr Bowes*) There is no conflict in creating the highway to make the Internet more achievable and useful.

160. So how is that disadvantaging the Internet?

(*Mr Bowes*) Simply because it is avoiding promotion of the Internet as well. We should be doing both.

Lord Hollick

161. But they are not mutually exclusive?

(*Professor Oppenheim*) They are not mutually exclusive, not at all.

Lord Flowers

162. Do you really mean they are putting too much effort into the technology and not enough into the content?

(*Mr Bowes*) Yes, absolutely.

Lord Gregson

163. Is not the advent of digital a rather sensitive argument, since you can bunch digital on a twisted pair very easily and the whole thing turns on its head at that stage, does it not?

(*Professor Oppenheim*) I think there is a lot of information, particularly images and moving images, for which you do need the band width, so that will be increasingly what people are wishing to make use of.

164. That is called television, is it not?

(*Professor Oppenheim*) No, because for television you require a single broadcasting station which then sends out. You are not getting the multiplicity of links which you get with Internet. Internet will certainly provide a—

165. You can have it in parallel, can you not?

(*Professor Oppenheim*) You could have and that is what we are suggesting. We are not saying you cannot have it.

(*Mr Bowes*) We are not suggesting either, my Lord Chairman, that we totally ignore technology. We are suggesting that maybe we should have a dedicated United Kingdom net for business as well, for example.

(*Professor Oppenheim*) Absolutely.

(*Mr Bowes*) I guess we are talking about the balance. We think that we are very much out of balance by not having that objective that we described earlier.

Chairman

166. There seems to me to be some sort of dilemma really. People, as you said earlier in our discussion, tend to regard the Internet as a prototypic superhighway but not in itself capable of becoming the superhighway we need, for various reasons, whereas the broadband network is the image we aspire to. So is it not a question of phasing the development of the broadband system to overtake the Internet, and how much do you put into the Internet in the interim?

(*Mr Bowes*) The Internet is not going to be overtaken and it will not go away. The Internet is going to grow and grow and there will be many Internets within the Internet. There will be Internet upon Internet upon Internet. The fact is that the amount of trading on the Internet now is rising astonishingly. It is very easy and cheap. There was an article in *The Financial Times* yesterday talking about the cost of trading on the Internet[8]. It is a fraction of the cost of trading in other ways. Clearly broadband prices will come down but that will not make the Internet redundant because the Internet will be useful sectorally as well as having that low price. Aslib is increasingly trading on the Internet. It is so easy, so cheap.

167. Many of us, oddly enough, do attempt to use the Internet and a good deal of the time we find it rather frustrating.

(*Mr Bowes*) Yes. It will get better.

168. I wonder if you could say something about ways in which that frustration might be ameliorated, either by software or further hardware developments?

(*Mr Bowes*) It is power.

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[8] *Financial Times*, Monday 26 February 1996, "Net's rivals feel the squeeze".

Chairman *contd.*]

(*Professor Oppenheim*) It is a mixture of things. The band width problem, certainly afternoon our time when the whole of the USA has woken up. If you want to get something on the Internet you can go away, have a cup of coffee, come back and it is still slowly downloading from the Internet.

Lord Gregson

169. It is more a matter of switching, is it not, than band widths?

(*Professor Oppenheim*) No, there is a genuine capacity problem. The technology is designed—

170. There are not enough switches in the world, in effect?

(*Professor Oppenheim*) But the technology is designed to split up the package in the most efficient way possible and the problem is the band width. It still is not sufficient. There is an issue there. But there is another issue, which is just the navigation and retrieval of material. At the moment there is so much material, it is growing so fast and so much of it is of a dubious quality, it has to be said, that you need indexes both to navigate your way round and retrieve information but you also need a quality guide. You need to have five-star information sites, four-star and three-star, based on some sort of general understanding of what the quality of the information is. So there is a lot of work still to be done to make it right, I totally agree.

Chairman

171. Could you say something about the ways in which, by the further development of software or other mechanisms, one might do something to improve the existing network while the broad-band is being delivered?

(*Professor Oppenheim*) One possible area which has been talked about a lot is so-called "intelligent agents" which are pieces of software which belong to you essentially and which understand your information needs, your information requirements and your priorities. They go out proactively on the Internet, retrieve information and actually interrupt you at work or when you are travelling or whatever and say, "There's a new piece of information just arrived. I think you should be interested in this." These things do not exist at the moment, but research is going on, primarily in the USA, in those areas. That is something on which the Government could encourage further research in the United Kingdom, because the bulk of the research is going on in the USA.

(*Mr Bowes*) That is another point. I think we have an attitude problem. In the United States there is a feeling that these problems will be overcome very quickly, and there is a positive attitude that they are indeed solving them. In the United Kingdom there is always a negative attitude and people say it is no good, they snigger at the Internet. One of our publishers has said that he will not touch a book on the Internet because it will go away. That is a British problem, and I think that is one of the problems stemming from the fact that we do not have any leadership from the top.

Lord Craig of Radley

172. Could we move on to the subject of government-owned information being offered free of charge and the copyright waived on the Internet as a way of helping the United Kingdom economy. You may know, or have seen, that Mr Freeman, in reply to a Written Question in the House of Commons on 9th February, talked about making available on the Internet service summaries of more than 200 Acts of Parliament and so on. I would be grateful to have a comment on the validity of this approach to encouraging better use of content.

(*Professor Oppenheim*) Mr Freeman's announcement was very welcome, but it only goes part of the way. The first point to be aware of is that in nearly all leading economies of the world government does not exercise copyright. That is true in the USA in particular but also in a number of other countries; there is no copyright in government-created information, full stop. We would argue that that is one of the reasons why the USA is ahead of us at the moment, because what happens is that all this government information is on the Internet, it is free of charge, and people are encouraged to copy it and add value to it. You then have two benefits from that sort of policy. The first benefit is that you encourage the information industry, the content providers; they are encouraged to take that information, add their own value—which might be commentary, it might be statistical analysis, it does not really matter—and sell that, so they then have a product which can be sold. Then the users have a choice: they can either go to the free information on the Internet, but it is not particularly well structured or does not have that added value, or they can pay for that added value. That happened in the USA where, for example, all the equivalent of Companies House information is available free of charge, free of copyright, but then companies take it, add value and do very good business out of it, because organisations would rather go to that quick and convenient source and pay a bit of money for it rather than wade their way through the free source. So it encourages the information industry. That is the first benefit. The second benefit is that by making government information much more widely available and much more widely available in electronic form, it will help ordinary people to play their full part as individuals and to become good citizens, so it will actually help everybody, both business and private individuals. Therefore, what we are arguing is that Mr Freeman's policy is fine as far as it goes, but we want it to go one step further which is to follow the United States route of being free of charge on the Internet, and copyright does not exist or is waived, so people do not have to ask permission to copy it, they know that they can add value and re-sell it.

Lord Flowers

173. Why not free of charge for access as well?

(*Professor Oppenheim*) Yes, that is what we are suggesting, and that is what the United States Government offers. I can go and get any United States company report free of charge, I do not have to pay a fee to the United States Government or

Lord Flowers *contd.*]

anybody else, and yet if I want to get that information in the United Kingdom I have to pay for it. We are saying it should be free of charge and free of copyright.

Lord Craig of Radley

174. Would you take it as far as requiring not only government information to be put on free of charge but also a whole host of industrial and commercial information also free of charge by the company or the industry concerned?

(*Professor Oppenheim*) No, not necessarily. No, it should be up to them if they wish to put it on there. What we are suggesting is that it should only be government information which would be specific, and there are certain ethical grounds for saying that taxpayers have paid for it once already, in effect, therefore taxpayers should get the benefit of that information.

Baroness Hogg

175. What would be the information market, then, for physically published government documents?

(*Professor Oppenheim*) By "physical" do you mean books like the Scott Report at £45 or something like that?

176. Yes, exactly.

(*Professor Oppenheim*) They would continue to be sold as a publication.

177. But who would then buy them if they could download them?

(*Professor Oppenheim*) In practice, if I had a choice between reading an item as a book or reading it on the screen, for convenience and comfort I might very well choose to buy the book over reading it on the screen.

178. But you could download it and print it out for yourself, could you not?

(*Professor Oppenheim*) Yes, but that is expensive.

(*Mr Bowes*) There is an implication for HMSO, that is right, but we feel that that is a very small price to pay for the advantage of our being able to add value to government information to prosper our businesses.

Lord Haskel

179. This leads on quite naturally to your statement in section 4 about an intellectual property exchange. How do you see it working? I was particularly interested to see that you also say that this exchange should value information. I am wondering how you would do that?

(*Mr Bowes*) We at Aslib are very keen to value intangibles, as indeed are many people and businesses. Information is, in a sense, an intangible. We think it is very important, though, in this day and age when businesses are driven by information and when, if you like, every business's second business is information that we really begin to value that information. We should be putting it on our balance sheets to add value to our businesses and to the economy. It is a very difficult thing to do at the moment, and there are many papers from my organisation where we have attempted to look at it. One way of moving towards it would be to have an intellectual property exchange where, just like a metals exchange, if you like, publishers would put all their information onto the exchange to be traded. It would help to create a value for a particular piece of information, a value which would be dependent upon demand and the value which the purchaser got out of it. I have to say we have not worked through the model, but, Georgina, perhaps you would like to add something?

(*Miss Dodd*) Might I add that it was not all that long ago, (I remember working in the City in the Seventies) when it was actually laughable that you could trade interest rates, that it was nonsense. I am afraid the people at Barings did not get it quite right. But it is certainly possible and if we looked at this and approached it, perhaps in the same way that the original financial futures went through the various investigations, the various thoughts, the various pilots of marketing it, how does it work, and you looked at the constraints of futures contracts, which are much more constrained than something you can pick up and pass across a counter, it is certainly not impossible. Personally I think this would be very exciting and I am sure there would be a large number of people the other side of Temple Bar who would have some money they would be willing to put into it.

Lord Haskel

180. But a lot of these schemes are for hedging. A lot of information which companies have they do not want their competitors to have?

(*Professor Oppenheim*) No, it would not be for that sort of information.

181. So how do you value that information?

(*Mr Bowes*) Unless they wanted to trade it.

Lord Gregson

182. I think the use of the reference to the Metals Exchange is rather unfortunate because that is measured by outcry. There is no way you could have that system.

(*Mr Bowes*) No, it would have to be electronic.

Lord Gregson] You would have to find a better system than that. The Metals Exchange is about the worst model you could use.

Lord Hollick

183. Could we come back to the friendliness or otherwise of the information superhighway. Given that most of the people who will be using it will not be expert, amongst those people quite a few will not have the skills and the training to find their way around. What steps do you think can be taken, in particular what steps can the government take, to make the information superhighway more accessible to the ordinary citizen?

(*Mr Bowes*) I think there are two areas. One is training and education. I believe that, as we say in our evidence, the government should encourage

Lord Hollick *contd.*]

partnerships and, where appropriate, provide pump-priming monies to raise the investment to improve the educational infrastructure. In other words, the subject should be in the National Curriculum, for example, and in opportunities for lifelong learning. This is a country which desperately needs this type of training for lifelong learning and, therefore, we need to set up systems, maybe distance-learning or in local schools, adult education courses, etc. in the use of the information infrastructure. In addition, of course, if we make it more readily accessible, both in the home, which is happening anyway, but in points of contact such as community centres and public libraries where there is help on hand, then that helps the individual. But there is certainly a major training and educational requirement needed at all levels.

Lord Gregson

184. You say in your paper that JANET and SuperJANET ought to be more widely available. Is there a block on its being available?

(*Mr Bowes*) Yes.

185. You cannot buy the service?

(*Professor Oppenheim*) No. That is a government decision, a Department of Education decision, because it was created for the educational sector and was invested with that in mind.

186. Mr Trippier could earn some money, could he not?

(*Mr Bowes*) Indeed, absolutely.

187. Perhaps the government ought to take notice of that?

(*Professor Oppenheim*) We would agree with that completely.

(*Mr Bowes*) It is very disappointing indeed. They would argue that there are ways in which you could get access but it is irrelevant.

188. It does cost the university more. I could ring up a friend and say, "Can I have this information?"

(*Mr Bowes*) Yes, exactly.

Lord Flowers

189. I must defend it. It was produced to serve university purposes.

(*Mr Bowes*) Absolutely right.

Lord Flowers] What is wrong with that?

Lord Gregson

190. What is wrong with industry using it?

(*Mr Bowes*) Exactly. There is nothing wrong with that, your Lordship. There is nothing wrong with industry using it as well now.

191. Yes, they can if they can make an arrangement.

(*Professor Oppenheim*) That is the problem.

(*Mr Bowes*) We think it is wrong to look at it that way. We think they should be more focused and objective and say industry can use it, not by arrangement, not by the back door. We think that is what is negative about so much of the leadership at the moment.

Chairman

192. I am afraid, Mr Bowes, that time, as is quite customary, has defeated us again and I must thank you and your colleagues for the evidence you have given us, which has been extremely helpful, because Mr Russon from the British Library has been sitting patiently listening to your evidence. You are, of course, free to sit and listen to his, if you wish. If you have any comments that you would like to make in the light of these questions on any topics that we have not covered, then please write to us again, but meanwhile, thank you very much indeed.

(*Mr Bowes*) Thank you, my Lord Chairman, and thank you to the Sub-Committee.

END NOTE 1

EUROPEAN COMMISSION DGXIII/E

INFO 2000 The Multimedia Revolution: New Opportunities for Europe BACKGROUND ON EUROPEAN UNION ACTIVITIES

February 1996

> "The content industry is a crucial sector for the European economy and society in terms of employment, competitiveness and preservation of Europe's cultural identity. Europe is lagging behind other parts of the world in the use of advanced information contents such as multimedia. A strong and healthy European content industry is vital if Europe is to exploit to the full the potential which the information society offers.
>
> "The European Union's information sector has many strengths: overall market size and population, the presence of world-ranking information and media conglomerates, and long-established publishing tradition, a rich information content base, large established markets in key industrial sectors and a rich cultural and linguistic diversity.
>
> "The European information industry is, however, also faced with a number of barriers to growth that prevent it from quickly realising the critical mass necessary to compete on equal terms at global level in

> the newly developing multimedia markets. Actions are needed at both national and European level if Europe is to exploit its richness in content and confront the growing global competition. At stake is whether the European content industry—employing more than two million people and with a turnover of ECU 150 billion in 1994—will be a powerful presence in its own domestic market. Or will mainly non-European players capture the lion's share of the growing demand for multimedia products?"

END NOTE 2

New Scientist

Europe joins the information cul-de-sac

24 February 1996

> "The European Commission launched its Info2000 plan in Cannes last week. The programme seeks to 'exploit Europe's public sector information', but this promise had a hollow ring. Officials from DG XIII, the Commission's telecommunications and information directorate, admitted that there are still no plans to put European patents on-line. The US Patent Office had already put its patents on the Internet but the European Patents Office in Munich only supplies libraries with CD-ROMs.
>
> "DGXIII's principal administrator, Bernard Smith says the Commission wants to exploit the vast resources of information owned by the public sector, which 'would be extremely valuable for both individuals and business users".
>
> "All the EPO's indexes are already in electronic form, along with copies of all patent applications filed through the EPO. But Smith was unable to say when this information would be available on the Internet. Did this mean there was no prospect of free access to the EPO's patent information? 'Don't quote me, Smith told a packed room full of journalists, 'but you're probably right'."

END NOTE 3

Department of Trade and Industry

TIPS UK—Creating an effective presence on the Internet for UK exportable products and services of both large and small enterprises

Ref DTI/CII—February 1996

> "The Internet is the world's fastest growing and most pervasive information network. It uses the world wide telephone network as its basic infrastructure and its main attraction is that its facilities can be accessed in the same way by individuals and organisations anywhere in the world, regardless of variations in their local systems and telecommunications platforms. Chief among these facilities are mechanisms for information exchange between users (email, on-line discussion and file transfer), plus access to a very large number of on-line information sources that present information in a standard way, using software called the World Wide Web. A further attraction and cause of the Internet's growth is that users with no existing computers or telecommunications facilities can readily participate by acquiring a low cost personal computer, low cost or even free software, a telephone connection and a subscription to a local Internet service provider, typically at or less than £10 per month."

END NOTE 4

Department of Trade and Industry

TIPS UK—Creating an effective presence on the Internet for UK exportable products and services of both large and small enterprises

Ref DTI/CII—February 96

> "A particular development that appears to have significant potential is the use of INTERNET as a means of buyers in industrial organisations finding suppliers to meet their needs. In this respect we are concerned that the UK seems to be trailing in well-focused developments aimed at this specific requirement. The reason for our concern is that, in its international context, it may affect the UK's export performance if it becomes easier, through the use of INTERNET technology, to locate foreign suppliers than UK ones."

END NOTE 5

DEPARTMENT OF TRADE AND INDUSTRY

TIPS UK—Creating an effective presence on the Internet for UK exportable products and services of both large and small enterprises

Ref DTI/CII—February 96

> "It is pressing for the UK to better organise its commercial effort on the Internet, since otherwise other countries will be the main beneficiaries of the rapid Internet developments. On the other hand the main objective of TIPS UK is to provide a super organisation of information on Internet on UK products and services that are available for export. This requires the job to be done well. This is one of the reasons to start with one sector and one pioneer trade association. Once the model has been got right, then the imperative becomes driving out for numbers."

END NOTE 6

DEPARTMENT OF TRADE AND INDUSTRY

TIPS UK—Creating an effective presence on the Internet for UK exportable products and services of both large and small enterprises

Ref DTI/CII—February 96

> "The success of the Internet brings with it new problems (including surges of congestion as infrastructure provision tries to keep up with the very rapid expansion). The new problems include how a user finds specific information from the huge mass of information now assembled on thousands of on-line World Wide Web sites (websites) and how a company ensures that its target audiences find the information the company places on the internet for them. Solutions to these new issues lay in the areas of critical mass of information, information being where people would expect to look for it, effective indexing mechanisms and effective promotion of the sites where specific information is located."

END NOTE 7

US GOVERNMENT NATIONAL INFORMATION INFRASTRUCTURE AND TASK FORCE AGENDA FOR ACTION

I. The Promise of the NII

Imagine you had a device that combined a telephone, a TV, a camcorder, and a personal computer. No matter where you went or what time it was, your child could see you and talk to you, you could watch a replay of your team's last game, you could browse the latest additions to the library, or you could find the best prices in town on groceries, furniture, clothes—whatever you needed.

Imagine further the dramatic changes in your life if:

- The best schools, teachers, and courses were available to all students, without regard to geography, distance, resources, or disability;
- The vast resources of art, literature, and science were available everywhere, not just in large institutions or big-city libraries and museums;
- Services that improve America's health care system and respond to other important social needs were available on-line, without waiting in line, when and where you needed them;
- You could live in many places without foregoing opportunities for useful and fulfilling employment, by "telecommuting" to your office through an electronic highway instead of by automobile, bus or train;
- Small manufacturers could get orders from all over the world electronically—with detailed specifications—in a form that the machines could use to produce the necessary items;
- You could see the latest movies, play the hottest video games, or bank and shop from the comfort of your home whenever you chose;
- You could obtain government information directly or through local organisations like libraries, apply for and receive government benefits electronically, and get in touch with government officials easily; and
- Individual government agencies, businesses and other entities all could exchange information electronically—reducing paperwork and improving service.

Information is one of the nation's most critical economic resources, for service industries as well as manufacturing, for economic as well as national security. By one estimate, two-thirds of US workers are in information-related jobs, and the rest are in industries that rely heavily on information. In an era of global markets and global competition, the technologies to create, manipulate, manage and use information are of strategic importance for the United States. Those technologies will help US businesses remain competitive and create challenging, high-paying jobs. They also will fuel economic growth which, in turn, will generate a steadily-increasing standard of living for all Americans.

That is why the Administration has launched the National Information Infrastructure initiative. We are committed to working with business, labour, academia, public interest groups, Congress, and state and local government to ensure the development of a national information infrastructure (NII) that enables all Americans to access information and communicate with each other using voice, data, image or video at anytime, anywhere. By encouraging private sector investment in the NII's development, and through government programs to improve access to essential services, we will promote US competitiveness, job creation and solutions to pressing social problems.

II. *What Is the NII?*

The phrase "information infrastructure" has an expansive meaning. The NII includes more than just the physical facilities used to transmit, store, process, and display voice, data, and images. It encompasses:

- A wide range and ever-expanding range of equipment including cameras, scanners, keyboards, telephones, fax machines, computers, switches, compact disks, video and audio tape, cable, wire, satellites, optical fiber transmission lines, microwave nets, switches, televisions, monitors, printers, and much more. The NII will integrate and interconnect these physical components in a technologically neutral manner so that no one industry will be favoured over any other. Most importantly, the NII requires building foundations for living in the Information Age and for making these technological advances useful to the public, business, libraries, and other non-governmental entities. That is why, beyond the physical components of the infrastructure, the value of the National Information Infrastructure to users and the nation will depend in large part on the quality of its other elements:
- The information itself, which may be in the form of video programming, scientific or business databases, images, sound recordings, library archives, and other media. Vast quantities of that information exist today in government agencies and even more valuable information is produced every day in our laboratories, studios, publishing houses, and elsewhere.
- Applications and software that allow users to access, manipulate, organise, and digest the proliferating mass of information that the NII's facilities will put at their fingertips.
- The network standards and transmission codes that facilitate interconnection and interoperation between networks, and ensure the privacy of persons and the security of the information carried, as well as the security and reliability of the networks.
- The people—largely in the private sector—who create the information, develop applications and services, construct the facilities, and train others to tap its potential. Many of these people will be vendors, operators, and service providers working for private industry.

Every component of the information infrastructure must be developed and integrated if America is to capture the promise of the Information Age.

The Administration's NII initiative will promote and support full development of each component. Regulatory and economic policies will be adopted that encourage private firms to create jobs and invest in the applications and physical facilities that comprise the infrastructure. The Federal government will assist industry, labour, academia, and state and local governments in developing the information resources and applications needed to maximise the potential of those underlying facilities. Moreover, and perhaps most importantly, the NII initiative will help educate and train our people so that they are prepared not only to contribute to the further growth of the NII, but also to understand and enjoy fully the services and capabilities that it will make available.

III. *Need for Government Action to Complement Private Sector Leadership*

The foregoing discussion of the transforming potential of the NII should not obscure a fundamental fact—the private sector is already developing and deploying such an infrastructure today. The United States communications system—the conduit through which most information is accessed or distributed—is second to none in speed, capacity, and reliability. Each year the information resources, both hardware and software, available to most Americans are substantially more extensive and more powerful than the previous year.

The private sector will lead the deployment of the NII. In recent years, US companies have invested more than $50 billion annually in telecommunications infrastructure—and that figure does not account for the vast investments made by firms in related industries, such as computers. In contrast, the Administration's ambitious agenda for investment in critical NII projects (including computing) amounts to $1–2 billion annually. Nonetheless, while the private sector role in NII development will predominate, the government has an essential role to play. In particular, carefully crafted government action can complement and enhance the benefits of these private sector initiatives. Accordingly, the Administration's NII initiative will be guided by the following nine principles and goals, which are discussed in more detail below:

(1) Promote private sector investment, through tax and regulatory policies that encourage innovation and promote long-term investment, as well as wise procurement of services.

(2) Extend the "universal service" concept to ensure that information resources are available to all at affordable prices. Because information means empowerment, the government has a duty to ensure that all Americans have access to the resources of the Information Age.

(3) Act as catalyst to promote technological innovation and new applications. Commit important government research programmes and grants to help the private sector develop and demonstrate technologies needed for the NII.

(4) Promote seamless, interactive, user-driven operation of the NII. As the NII evolves into a "network of networks", government will ensure that users can transfer information across networks easily and efficiently.

(5) Ensure information security and network reliability. The NII must be trustworthy and secure, protecting the privacy of its users. Government action will also aim to ensure that the overall system remains reliable, quickly repairable in the event of a failure and, perhaps most importantly, easy to use.

(6) Improve management of the radio frequency spectrum, an increasingly critical resource.

(7) Protect intellectual property rights. The Administration will investigate how to strengthen domestic copyright laws and international intellectual property treaties to prevent piracy and to protect the integrity of intellectual property.

(8) Coordinate with other levels of government and with other nations. Because information crosses state, regional, and national boundaries, coordination is important to avoid unnecessary obstacles and to prevent unfair policies that handicap US industry.

(9) Provide access to government information and improve government procurement. As described in the National Performance Review, the Administration will seek to ensure that Federal agencies, in concert with state and local governments, use the NII to expand the information available to the public, so that the immense reservoir of government information is available to the public easily and equitably. Additionally, Federal procurement policies for telecommunications and information services and equipment will be designed to promote important technical developments for the NII and to provide attractive incentives for the private sector to contribute to NII development.

— The time for action is now. Every day brings news of change: new technologies, like hand-held computerised assistants; new ventures and mergers combining businesses that not long ago seemed discrete and insular; new legal decisions that challenge the separation of computer, cable and telephones. These changes promise substantial benefits for the American people, but only if government understands fully the implications of these changes and to work with the private sector and other interested parties to shape the evolution of the communications infrastructure.

IV. *Managing Change/Forging Partnerships*

We will help to build a partnership of business, labour, academia, the public, and government that is committed to deployment of an advanced, rapid, powerful infrastructure accessible and accountable to all Americans.

Forging this partnership will require extensive inter-governmental coordination to ensure that Administration, Congressional, state and local government policy regarding the NII is consistent, coherent, and timely. It also requires the development of strong working alliances among industry groups and between government and the businesses responsible for creating and operating the NII. Finally, close cooperation will be needed between government, users, service providers, and public interest groups to ensure that the NII develops in a way that benefits the American people.

Specifically, the Administration will:

(1) Establish an interagency Information Infrastructure Task Force. The President has convened a Federal inter-agency "Information Infrastructure Task Force" (IITF) that will work with Congress and the private sector to propose the policies and initiatives needed to accelerate deployment of a National Information Infrastructure. Activities of the IITF include coordinating government efforts in NII applications, linking government applications to the private sector, resolving outstanding disputes, and implementing Administration policies. Chaired by Secretary of Commerce Ron Brown and composed of high-level Federal Agency representatives, the IITF's three committees focus on telecommunications policy, information policy, and applications.

(2) Establish a private sector Advisory Council on the National Information Infrastructure. To facilitate meaningful private sector participation in the IITF's deliberations, the President will sign an Executive Order creating the "United States Advisory Council on the National Information Infrastructure" to advise the IITF on matters relating to the development of the NII. The Council will consist of 25 members, who will be named by the Secretary of Commerce by December 1993. Nominations will be solicited from a variety of NII constituencies and interested parties. The IITF and its committees also will use other mechanisms to solicit public comment to ensure that it hears the views of all interested parties.

(3) Strengthen and streamline Federal communications and information policy-making agencies. In order to implement the ambitious agenda outlined in this document, the federal agencies most directly responsible for the evolution of the NII (such as NTIA, the Office of Information and Regulatory Affairs at OMB, and the FCC) must be properly structured and adequately staffed to address many new and difficult policy issues. The Administration intends to ensure that these agencies have the intellectual and material resources they need. In addition, in accord with the Vice President's National Performance Review, these agencies will make the organisational and procedural changes needed to most effectively contribute to the NII initiative.

V. *Principles and Goals for Government Action*

The Task Force currently is undertaking a wide-ranging examination of all issues relevant to the timely development and growth of the National Information Infrastructure. Specific principles and goals in areas where government action is warranted have already been identified and work has begun on the following matters:

1. Promote Private Sector Investment

One of the most effective ways to promote investments in our nation's information infrastructure is to introduce or further expand competition in communications and information markets. Vibrant competition in these markets will spur economic growth, create new businesses and benefit U.S. consumers.

To realise this vision, however, policy changes will be necessary:

Action: Passage of communications reform legislation. The Administration will work with Congress to pass legislation by the end of 1994 that will increase competition and ensure universal access in communications markets—particularly those, such as the cable television and local telephone markets, that have been dominated by monopolies. Such legislation will explicitly promote private sector infrastructure investment—both by companies already in the market and those seeking entry.

Action: Revision of tax policies. Tax policies are important determinants of the amount of private sector investment in the NII. The President has signed into law tax incentives for private sector investment in R&D and new business formation, including a three-year extension of the R&D credit and a targeted capital gains reduction for investments in small businesses. Both of these tax incentives will help spur the private sector investment needed to develop the NII.

2. Extend the "Universal Service" Concept to Ensure that Information Resources Are Available to All at Affordable Prices

The Communications Act of 1934 articulated in general terms a national goal of "Universal Service" for telephones—widespread availability of a basic communications service at affordable rates. A major objective in developing the NII will be to extend the Universal Service concept to the information needs of the American people in the 21st Century. As a matter of fundamental fairness, this nation cannot accept a division of our people among telecommunications or information "haves" and "have-nots." The Administration is committed to developing a broad, modern concept of Universal Service—one that would emphasise giving all Americans who desire it easy, affordable access to advanced communications and information services, regardless of income, disability, or location.

Devising and attaining a new goal for expanded Universal Service is consistent with efforts to spur infrastructure development by increasing competition in communications and information markets. As noted above, competition can make low cost, high quality services and equipment widely available. Policies promoting greater competition in combination with targeted support for disadvantaged users or especially high cost or rural areas would advance both rapid infrastructure modernisation and expanded Universal Service.

Action: Develop a New Concept of Universal Service. To gather information on the best characteristics of an expanded concept of Universal Service, the Commerce Department's National Telecommunications and Information Administration (NTIA) will hold a series of public hearings on Universal Service and the NII, beginning by December 1993. The Administration will make a special effort to hear from public interest groups,. Building on the knowledge gained from these activities, the IITF, will work with the Advisory

Council on the National Information Infrastructure, as well as with state regulatory commissions, to determine how the Universal Service concept should be applied in the 21st Century.

3. Promote Technological Innovation and new Applications

Government regulatory, antitrust, tax, and intellectual property policies all affect the level and timing of new offerings in services and equipment—including the technology base that generates innovations for the marketplace. But technological innovations ultimately depend upon purposeful investment in research and development, by both the private sector and government. R&D investment helps firms to create better products and services at lower costs.

As noted in the Administration's 22 February 1993 technology policy statement: "We are moving to accelerate the development of technologies critical for long-term growth but not receiving adequate support from private firms, either because the returns are too distant or because the returns are too distant or because the level of funding required is too great for individual firms to bear." Government research support already has helped create basic information technologies in computing, networking and electronics. We will support further NII-related research and technology development through research partnerships and other mechanisms to accelerate technologies where market mechanisms do not adequately reflect the nation's return on investment. In particular, these government research and funding programs will focus on the development of beneficial public applications in the fields of education, health care, manufacturing, and provision of government services.

Action: Continue the High-Performance Computing and Communications Program. Established by the High-Performance Computing Act of 1991, the HPCC Program funds R&D designed to create more powerful computers, faster computer networks, and more sophisticated software. In addition, the HPCC Program is providing scientists and engineers with the tools and training they need to solve "Grand Challenges", research problems—like designing new drugs—that cannot be solved without the most powerful computers. The Administration has requested $1 billion for the HPCC Program in fiscal year 1994, and is in the process of forming a "High-Performance Computing Advisory Committee", to provide private sector input on the Program.

We have also requested an additional $96 million in the FY 1994 budget to create a new component of the HPCC Program—Information Infrastructure Technologies and Applications (IITA). The Administration is working with Congress to obtain authorisation to fund this effort, which will develop and apply high-performance computing and high-speed networking technologies for use in the fields of health care, education, libraries, manufacturing, and provision of government information.

Action: Implement the NII Pilot Projects Program. In its FY 94 budget, the Administration has requested funding from the Congress for NII networking pilot and demonstration projects. Under NTIA's direction, this pilot program will provide matching grants to state and local governments, health care providers, school districts, libraries, universities, and other non-profit entities. The grants will be awarded after a competitive merit review process and will be used to fund projects to connect institutions to existing networks, enhance communications networks that are currently operational, and permit users to interconnect among different networks. Funded projects will demonstrate the potential of the NII and provide tangible benefits to their communities. Equally important, they will help leverage the resources and creativity of the private sector to devise new applications and uses of the NII. The successes of these pilot projects will create an iterative process that will generate more innovative approaches each year.

Action: Inventory NII Applications Projects. Many insights can be gained by sharing information about how government can effectively use the NII. By the end of January 1994, the IITF will complete an inventory of current and planned government activities and will widely disseminate the results through electronic and printed means. An electronic forum is being established to encourage government and private sector contributions and comments about government applications projects.

*4. Promote Seamless, Interactive, User-Driven Operation

Because the NII will be a network of networks, information must be transferable over the disparate networks easily, accurately, and without compromising the content of the messages. Moreover, the NII will be of maximum value to users if it is sufficiently "open" and interactive so that users can develop new services and applications or exchange information among themselves, without waiting for services to be offered by the firms that operate the NII. In this way, users will develop new "electronic communities" and share knowledge and experiences that can improve the way that they learn, work, play, and participate in the American democracy. To assure interoperability and openness of the many components of an efficient, high-capacity NII, standards for voice, video, data, and multi-media services must be developed. Those standards also must be compatible with the large installed base of communications technologies, and flexible and adaptable enough to meet user needs at affordable costs. The United States has long relied on a consensus-based, voluntary standards-setting process in communications. Particularly in the area of information and communications technology, where product cycles are often measured in months, not years, the standards process is critical and has not always worked to speed technological innovation and serve end-users well. Government can catalyze this industry-driven process by participating more actively in private-sector standards-writing bodies and by working with industry to address strategic technical barriers to interoperability and adoption of new technologies. To increase the likelihood that the NII will be both interactive and, to a large extent, user-driven, government also must reform regulations and policies that may inadvertently hamper the development of interactive applications. For example, government regulations concerning the lack of reimbursement of health care procedures may deter the growth of distance medicine applications.

Action: Review and clarify the standards process to speed NII applications. By 15 October 1993 the Commerce Department's National Institute for Standards and Technology (NIST) will establish a panel and work with other appropriate agencies to review the government's involvement in establishing network requirements and standards with domestic and international partners. The panel, with input from the private sector and other levels of government, will consider the role of the government in the standards process and will identify opportunities for accelerating the deployment of the NII.

Action: Review and reform government regulations that impede development of interactive services and applications. The Administration will work closely with the private sector, as well as state and local governments, to identify government policies and regulations that may hinder the growth of interactive services and applications. The IITF will determine how those regulations should be changed.

5. Ensure Information Security and Network Reliability

The trustworthiness and security of communications channels and networks are essential to the success of the NII. Users must be assured that information transmitted over the infrastructure will go when and where it is intended to go. Electronic information systems can create new vulnerabilities. For example, electronic files can be broken into and copied from remote locations, and cellular phone conversations can be monitored easily. Yet these same systems, if properly designed, can offer greater security than less advanced communications channels.

Through the use of information systems, gathering, sending, and receiving a wide variety of personal information is now simple, quick, and relatively inexpensive. The use of information technologies to access, modify, revise, repackage, and resell information can benefit individuals, but unathorised use can encroach on their privacy. While media reports often emphasise the role of modern information technology in invading privacy, technology advances and enhanced management oversight also offer the opportunity for privacy protection. This protection is especially important to businesses that increasingly transmit sensitive proprietary data through electronic means. In a climate of tough global competitiveness to gain market advantage, the confidentiality of this information can spell the difference between business success or failure.

In addition, it is essential that the Federal government work with the communications industry to reduce the vulnerability of the nations's information infrastructure. The NII must be designed and managed in a way that minimises the impact of accident or sabotage. The system must also continue to function in the event of attack or catastrophic natural disaster.

Action: Review privacy concerns of the NII. The IITF has developed a work plan to investigate what policies are necessary to ensure individual privacy, while recognising the legitimate societal needs for information, including those of law enforcement. The IITF has also developed a work plan to investigate how the government will ensure that the infrastructure's operations are compatible with the legitimate privacy interests of its users.

Action: Review of encryption technology. In April, the President announced a thorough review of Federal policies on encryption technology. In addition, Federal agencies are working with industry to develop new technologies that protect the privacy of citizens, while enabling law enforcement agencies to continue to use court-authorised wiretaps to fight terrorism, drug rings, organised crime, and corruption. Federal agencies are working with industry to develop encryption hardware and software that can be used for this application.

Action: Work with industry to increase network reliability. The National Communications System brings together 23 Federal agencies with industry to reduce the vulnerability of the nation's telecommunications systems to accident, sabotage, natural disaster, or military attack. And the Federal Communications Commission has an industry and user Network Reliability Council to advise it on ensuring the reliability of the nation's commercial telecommunications networks. These efforts are increasingly important as the threat posed by terrorism and computer hacking grows. The NCS will continue its work and will coordinate with the IITF. In addition, the National Security Telecommunications Advisory Committee, which advises the President in coordination with the NCS, as well as the FCC's Network Reliability Council, will coordinate with and complement the work of the Advisory Council on the National Information Infrastructure.

6. Improve Management of the Radio Frequency Spectrum

Many of the dramatic changes expected from the development of the information infrastructure will grow out of advances in wireless technologies. The ability to access the resources of the NII at any time, from anywhere in the country, will be constrained, however, if there is inadequate spectrum available. To ensure that spectrum scarcity does not impede the development of the NII, the Administration places a high priority on streamlining its procedures for the allocation and use of this valuable resource.

Action: Streamline allocation and use of spectrum. The Administration is working with Congress to fully implement the spectrum management provisions of the Omnibus Budget and Reconciliation Act of 1993, to streamline government use of spectrum and to get spectrum to the public efficiently. These provisions will provide greater flexibility in spectrum allocation, including increased sharing of spectrum between private sector and government users, increased flexibility in technical and service standards, and increased choices for licensees in employing their assigned spectrum.

Action: Promote market principles in spectrum distribution. Further, the Administration will continue to support policies that place a greater reliance on market principles in distributing spectrum, particularly in the assignment process, as a superior way to apportion this scarce resource among the widely differing wireless services that will be a part of the NII. At the same time, the Administration will develop policies to ensure that entrepreneurs and small, rural, minority and women-owned businesses are able to participate in spectrum auctions.

7. Protect Intellectual Property Rights

Development of an advanced information infrastructure will create unprecedented market opportunities and new challenges for our world-preeminent media and information industries. The broad public interest in promoting the dissemination of information to our citizens must be balanced with the need to ensure the integrity of intellectual property rights and copyrights in information and entertainment products. This protection is crucial if these products—whether in the form of text, images, computer programs, databases, video or sound recordings, or multimedia formats—are to move in commerce using the full capability of the NII.

Action: Examine the adequacy of copyright laws. The IITF will investigate how to strengthen domestic copyright laws and international intellectual property treaties to prevent piracy and to protect the integrity of intellectual property. To ensure broad access to information via the NII, the IITF will study how traditional concepts of fair use should apply with respect to new media and new works.

Action: Explore ways to identify and reimburse copyright owners. The IITF will explore the need for standards for the identification of copyright ownership of information products in electronic systems (eg, electronic headers, labels or signature techniques). The Task Force will also evaluate the need to develop an efficient system for the identification, licensing, and use of work, and for the payment of royalties for copyrighted products delivered or made available over electronic information systems.

8. Coordinate with Other Levels of Governmental and with Other Bodies

Domestic: Many of the firms that will likely participate in the NII are now subject to regulation by Federal, state, and local government agencies. If the information infrastructure is to develop quickly and coherently, there must be close coordination among the various government entities, particularly with respect to regulatory policy. It is crucial that all government bodies—particularly Congress, the FCC, the Administration, and state and local governments—work cooperatively to forge regulatory principles that will promote deployment of the NII.

Action: Seek ways to improve coordination with state and local officials. The IITF will meet with state and local officials to discuss policy issues related to development of the NII. The Task Force will also seek input from the private sector and non-federal agencies as it devises proposals for regulatory reform. The Administration is committed to working closely with state and local governments in developing its telecommunications policies.

International: The NII also will develop in the context of evolving global networks. Because customers typically demand that US communications providers offer services on a global basis, it is critical that the infrastructure within this country can meet international, as well as domestic, requirements.

Action: Open up overseas markets. The Administration has shown its willingness to work directly on behalf of US firms to ensure that they have an equal opportunity to export telecommunications-related goods and services to potential overseas customers. For example, the Commerce Department is developing new export control policies governing computers and telecommunications equipment manufactured by US firms. These changes will remove export restrictions on many of these products and permit US manufacturers to enter new markets not previously available to them. The Administration will continue to work to open overseas markets for US services and products.

Action: Eliminate barriers caused by incompatible standards. Equally important is the need to avoid trade barriers raised by incompatible US and foreign standards or—more subtly—between the methods used to test conformance to standards. Through its participation in international standards committees, the Administration is working to eliminate or avert such barriers.

Action: Examine international and US trade regulations. The IITF will coordinate the Administration's examination of policy issues related to the delivery of telecommunications services to and from the US, including claims by some US companies that regulatory practices in foreign countries—including denial of market access for US carriers and the imposition of excessive charges for completing calls from the United States—are harming the competitiveness of the industry and the costs charged to US customers for service. The IITF also will reexamine US regulation of international telecommunications services.

9. Provide Access to Government Information and Improve Government Procurement

Thomas Jefferson said that information is the currency of democracy. Federal agencies are among the most prolific collectors and generators of information that is useful and valuable to citizens and business. Improvement of the nation's information infrastructure provides a tremendous opportunity to improve the delivery of government information to the taxpayers who paid for its collection; to provide it equitably, at a fair price, as efficiently as possible.

The Federal government is improving every step of the process of information collection, manipulation, and dissemination. The Administration is funding research programmes that will improve the software used for browsing, searching, describing, organising, and managing information. But it is committed as well to applying those tools to the distribution of information that can be useful to the public in their various roles as teachers, researchers, businesspeople, consumers, etc.

The key questions that must be addressed are: What information does the public want? What information is in electronic form? By what means can it be distributed? How can all Americans have access to it? A secondary question is: How can government itself improve through better information management?

Action: Improve the accessibility of government information. IITF working groups will carefully consider the problems associated with making government information broadly accessible to the public electronically. Additionally, several inter-agency efforts have been started to ensure that the right information is stored and available. Finally, to help the public fund government information, an inter-agency project has been formed to develop a virtual card catalogue that will indicate the availability of government information in whatever form it takes.

Action: Upgrade the infrastructure for the delivery of government information. The Federal government has already taken a number of steps to promote wider distribution of its public reports. Legislation has been enacted to improve electronic dissemination of government documents by the Government Printing Office. A number of Federal agencies have moved aggressively to convert their public information into electronic form and disseminate it over the Internet, where it will be available to many more people than have previously had access to such information. In the future, substantial improvements will be made to "FedWorld", an electronic bulletin board established by the Department of Commerce's National Technical Information Service (NTIS), which links the public with more than 100 Federal bulletin boards and information centers. These improvements will enhance FedWorld's ability to distribute to the public scientific, technical, and business-related information generated by the US Government and other sources. Finally, a conference will be held in the Fall of 1993 to begin teaching Federal employees how they can use these distribution mechanisms.

Action: Enhance citizen access to government information. In June 1993, OMB prescribed new policies pertaining to the acquisition, use, and distribution of government information by Federal agencies. Among other things, the policies mandate that, in distributing information to the public, Federal agencies should recoup only those costs associated with the dissemination of that information, not with its creation or collection. Moreover, a number of inter-agency efforts are under way to afford greater public access to government information. One project seeks to turn thousands of local and field offices of various Federal agencies into Interactive Citizen Participation Centres, at which citizens can communicate with the public affairs departments of all Federal agencies.

Action: Strengthen inter-agency coordination through the use of electronic mail. To implement the National Performance Review's recommendation on expanded use of electronic mail within the Federal government, an inter-agency coordinating body has been established to incorporate electronic mail into the daily work environment of Federal workers. The group is also sponsoring three pilot projects to expand connectivity that will build a body of experience that other Federal agencies can draw on when they begin to use electronic mail.

Action: Reform the Federal procurement process to make government a leading-edge technology adopter. The Federal government is the largest single buyer of high technology products. The government has played a key role in developing emerging markets for advanced technologies of military significance; it can be similarly effective for civilian technologies. The Administration will implement the procurement policy reforms set forth in the National Performance Review report.

(vi) *America's Destiny is Linked to our Information Infrastructure*

The principles and goals outlined in this document provide a blueprint for government action on the NII. Applying them will ensure that government provides constructive assistance to US industry, labour, academia and private citizens as they develop, deploy and use the infrastructure.

The potential benefits for the nation are immense. The NII will enable US firms to compete and win in the global economy, generating good jobs for the American people and economic growth for the nation. As importantly, the NII promises to transform the lives of the American people. It can ameliorate the constraints of geography and economic status, and give all Americans a fair opportunity to go as far as their talents and ambitions will take them.

Memorandum by the British Library

PREAMBLE

1. The British Library welcomes this opportunity to contribute to the Select Committee's enquiry into the Information Superhighway. In this response we shall refer to the Internet as the currently-available precursor of the Information Superhighway.

2. The Library is the world's leading resource for scholarship, research and innovation. Its rich collections include 18 million volumes, 900,000 sound recordings, 33 million patents, 600,000 volumes of newpapers and many more resources. Some 400,000 reader visits are made to the Library's reading rooms every year. Over 1 million documents of the 5 million requested annually go to the industrial and commercial sector, while its services in support of universities, schools and colleges are also heavily used. The Library contributes over £8 million annually in overseas earnings to the UK economy.

THE BRITISH LIBRARY'S VISION

3. The Library's *Information Systems Strategy* (published in November 1995) highlights the British Library's intention to become a major centre for the storage of and access to digital texts and images by the year 2000. The objective is to assist readers to trace and access the material they want, quickly and efficiently, whether they are in a British Library reading room or using the Library's information and document delivery services over the Information Superhighway. We do not envisage an exclusively digital library, but it is clear that a major role for the British Library will be that as a prime supplier of content on the Information Superhighway. We intend to play a full part in co-operation and collaboration with others in education, business and the public sector in the development of the national library network for the year 2000.

4. The Library believes that the development of the Information Superhighway will be of central importance to the UK's information industry and that the Committee is right to turn its attention to the opportunities and, indeed, the problems, that it presents. While, quite correctly, there has been considerable debate on the question of access to the Information Superhighway, the question of content is equally important. The UK's traditional strengths in publishing and in the enterprise of its library and information community mean that there are considerable opportunities for this country in the evolution of the Highway. However, we may not be able to exploit such opportunities if the country's creative output is not encouraged by Government in the ways we suggest below.

5. The British Library provides services to education, industry and commerce, the health and research communities, it believes that the implications for these sectors of the developments that the Committee will be examining are profound.

6. In response to the challenge presented by the Internet and related technologies, the British Library has launched a number of innovative digitisation and networking projects. The Library's *Initiatives for Access* programme, which was inaugurated in July 1993, currently includes some 20 development projects, which investigate hardware and software platforms for the digitisation and networking of a range of Library materials. Among these projects is *Portico,*the Library's on-line information service *(http://portico.bl.uk/)* which provides information about the Library's collections and services to Internet users through the World Wide Web. The Library's experimental Network On-line Public Access Catalogue service is already available at over 120 UK universities and a very small number of public libraries. There are now over four million

patents held on a CD-ROM jukebox system, pointing the way to the future in which such data will be very largely held in digital form and distributed over networks. The Library is investigating the hardware and software solutions applicable, and is also addressing issues of copyright—both in terms of intellectual rights of material it wishes to digitise, and preserving copyright on text and images which are made available over networks. It is also seeking solutions to the problems associated with indexing of digitised material. In addition, the Library is working with manufacturers and other information providers to develop and implement technical standards for digitisation and transmission of text and image files.

7. The British Library has been playing a major role in collaborative projects aimed at developing networked information services and raising awareness. It is an active partner in a number of projects in universities and funds the Office for Library and Information Networking (jointly with the Joint Information Systems Committee of the Higher Education Funding Councils). The Library is also a leading player within Europe in a number of research and development network projects involving other national libraries.

THREE IMPORTANT DIMENSIONS

8. The Library wishes to emphasise three aspects of the Information Superhighway. Firstly, it is undeniably designed to operate in a world-wide environment. While we in the UK can encourage access to it and nurture information services on it, it can only be regulated by international agreement. This is one area where globalisation is a genuinely inescapable force.

9. Additionaly, the Information Superhighway offers opportunities for public and private sector partnership. Without the blend of resources, information, expertise and enterprise which such partnerships offer, services on the Net will not succeed. The British Library is actively exploring with private sector partners how its plans for the "digital library" can be taken forward.

10. Moreover, the electronic environment encourages the proliferation of information and the traditional functions of libraries, of selecting, organising, preserving and providing access to the record of knowledge and ideas, become even more necessary than they already were in the traditional print on paper environment.

SUGGESTED KEY DEVELOPMENTS

11. The Library suggests that there are six ways in which Parliament and Government can make a major contribution to encouraging the evolution of the Information Superhighway to the benefit of the UK. Several of the problems at which these ideas are aimed represent serious impediments to progress.

11.1 As universal access is far from being attained, we believe it is necessary to gain a "critical mass" of users and to develop an infrastructure to deliver to as broad a community as possible. There are thought to be some 2.35 million people in the UK who have used the Internet in the last year; 50 per cent more intended to use it in the next 12 months (source: NOP Research Group, based on survey carried out March—August 1995). It is likely that most of this use will be for electronic mail, but there is a growing demand for information services; for example, the British Library's own World Wide Web server, *Portico,* saw some one million accesses in its first six months. The recent addition of *The Times* and *Sunday Times* newspapers to the Internet emphasises its growing role as a provider of current information to a growing community and mirrors the development of electronic journals in academic institutions and libraries. The UK has one of the highest number of users connected to the Internet in Europe. However, other countries are catching up, and, if the UK is to continue to develop business, education and information services, the domestic market must grow to a size which will sustain such services. We recommend that Government should undertake three initiatives to achieve this result:

— the connection of all schools, colleges, public libraries and Citizens Advice Bureaux to the Internet within two years. Such a programme would complete the networking of the UK's educational and information systems, in which the university sector has led the way. There are a number of schemes offering very limited funding on a competitive basis for schools at the moment but their effectiveness in transforming the possibilities for access to the vast majority of the young people of this country must be questioned. A survey undertaken in November 1995 by the Office for Library and Information Networking, the Library and Information Commission and the British Library established that only 0.7 per cent of all public library service points in the UK provide Internet access to the public, and yet public libraries offer an ideal route by which large sectors of the population, including small businesses, students and the general public can become accustomed to this new medium for conveying and exchanging information. There has been lively debate over the last six months on the various mechanisms for connecting public institutions to the Internet; we would urge that the time has come for decision and action.

— the encouragement of domestic users to connect their home computers to improve their access to study and information. The slow progress in this market so far encountered suggests that the current telecommunications and cable regulatory frameworks need to be reviewed.

- a programme to encourage industry and commerce, but especially small businesses, to connect to the Internet. Although electronic mail is now a cheap and very effective method of communicating with overseas customers—a vital feature when it comes to exports—the Department of Trade and Industry point out that only 3 per cent of UK managers use external email in business compared to 25 per cent in the USA. Access to the wealth of business information and advice services which could be provided by agencies including the British Library would be a significant advantage. A proposed initiative from the DTI (the Information Society Initiative) which was aimed at encouraging British business to use the new technology seems to have failed to get off the ground.

11.2 The UK Government should enact new legislation to ensure the nation is able to acquire, maintain and preserve electronic publications made available over the Information Superhighway for the benefit of future generations. This would include publications which would be provided over the Superhighway. The British Library cannot afford to purchase all the publications it requires to serve the economy, education, industry or other sectors of the community. Along with five other libraries, it is in the privileged position of receiving UK printed publications through legal deposit, a Statutory provision, which exists in all countries of the world. Current legal deposit legislation does not even cover microform publications, let alone electronic ones. The need for new legislation is acute. Publications in non-print form continue to increase in number and in some cases they are beginning to replace the traditional printed form of publication. The British Library is about to submit a proposal for the legal deposit of non-print publications to the Department of National Heritage. Government is urged to bring legal deposit legislation within the UK in line with legislation in many other developed countries.

11.3 The UK Government will need to play a leading role in addressing a raft of legal issues relating to the Internet in international fora such as G7 and the European Union. Among these issues are copyright and other intellectual property rights, data protection, and censorship. Consultation with users and the information providers is needed to inform an agenda which is then pursued internationally to ensure that not only are rights owners able to conduct their businesses profitably but that the hospitality of the Internet to new and innovative services is not impaired.

11.4 In the same context, it is important to gain international agreement on effective mechanisms for charging for information on the Internet. There are questions relating to software for handling secure financial transactions, licensing, international trade regulation and technical standards.

11.5 The UK Government should commit itself formally to setting high standards of presentation, quality and accuracy in its own information services on the Internet. It should also encourage other publicly funded bodies to observe such standards. By taking the lead in such a way, the UK information industry would undoubtedly be enhanced in reputation and its ability to serve the rest of the world. This programme would also entail the connection of Government and Government-funded agencies such as the health sector to the Internet.

11.6 While there is considerable public interest in the Information Superhighway, there is also a lack of knowledge and understanding; user training is a strangely neglected area. Information on the Superhighway, on what it can and cannot do, should be disseminated; in the work environment as well as in schools and in the media, training and information programmes should be encouraged. There are roles here for the Government, the private sector and for agencies such as colleges and libraries.

Examination of Witness

Mr D Russon, Director General, British Library, called in and examined.

Chairman

193. Mr Russon, thank you very much indeed for coming. Would you like to make some sort of introductory statement?

(*Mr Russon*) Thank you very much, my Lord Chairman. First of all, can I thank the Sub-Committee for giving the Library the opportunity to contribute to your enquiry. Given that you are taking evidence from a wide range of organisations, I thought it would be helpful if, in these introductory remarks, I focused on those parts of our written evidence which are of distinct and special interest to the Library and, in fact, which do require action by government. I refer to the matter of legal deposit. In our written evidence we have sought to indicate the scale and the nature of the support that the Library gives to Britain's scholarship, Britain's research and Britain's wealth creation. The information superhighway offers us enormous possibilities to extend our ability to provide information speedily and effectively in support of those purposes. The extent of our present ability to do that lies very significantly in the fact that the Library has enjoyed over a long period the privilege of legal deposit of printed publications. We believe that if we are to continue to fulfil our responsibilities in the future, it is now essential that legislation be enacted to extend the principle of legal deposit to non-print materials. The Library has now submitted its proposal to the Department of National Heritage and, my Lord Chairman, I have a copy of the submission here and am happy to leave it with the Clerk if you so wish. Given that this is a Science and Technology Committee, and in support of those earlier remarks, I might add that I spent last week at a meeting held in Paris under the auspices of UNESCO and ICSU, the International Council for Scientific Unions, which was examining the issues relating to scientific electronic publishing. It was a meeting that brought together leading scientists, librarians and publishers from around the world, and one of the key conclusions of that meeting was: "Given the traditional role of publication in science in providing an archive, it is timely and urgent that attention be given to ensuring the archiving of science in electronic formats." I think it was evident in that meeting that there is now quite widespread recognition that we need to start to grip that issue, not just nationally but internationally. So I hope you will forgive me, my Lord Chairman, in focusing on that particular aspect of our written evidence because I am sure the other points have been covered by many other organisations; I would therefore like to draw your attention to that particular aspect, which we believe is of critical importance to the Library and to the nation.

194. On that particular topic, could I ask you whether you have the support of the other deposit libraries—the National Library of Scotland, the Bodleian and so on—in this pressure?

A. Indeed, I should make it clear that the British Library has put forward the case, but it has done so on behalf of all the copyright libraries and indeed with the support of other interested archival bodies. We recognise that it is not just the British Library which will need to be involved as an archive, it will need to involve several organisations which have the appropriate skills for the appropriate materials.

Lord Flowers

195. To understand a little better what you are saying, will you explain the difference between electronic archiving scientific material or any material and electronic publication of it (if there is a difference)?

A. Yes, I believe there is a difference, my Lord. Electronic publishing is making an item available, often on commercial terms, and that will be available to the public so long as it remains "in print" and available. An archive becomes critical when an item goes out of publication and is no longer readily available.

196. So you see these as two quite separate operations conducted by different people probably?

A. They can, of course, come together. At the moment we do in fact bring those two things together, in that for printed material the Library receives publications on legal deposit and these are available for consultation by any citizen in the reading rooms of the British Library, but they are also there to be preserved by the Library so that they are available for future generations. Whilst we are collecting the printed material for future generations, because legal deposit does not extend to electronic publications, we are not collecting that material, which will therefore probably be unavailable to future generations.

Lord Gregson

197. Does a point not come at some time when it is impossible to store printed information and the only convenient way of doing it is electronically? There will come a time when that will happen, surely?

A. There are obviously difficulties in storing both paper material and electronic material. The problem with paper is first of all the volume of the material, so that we constantly need new buildings to house the material. Then there is the physical degradation of the material, and again that requires expenditure either to preserve the original or to transfer the original to a copy, be it an electronic copy or a microfilm copy. There will obviously also be expenditure in preserving an electronic record, in that the electronic imaging, because of degradation, will need refreshing.

198. So will you have electronic as well as microfilm copy, in parallel?

A. At present we are still relying on microfilm as the prime archival medium because that is the one where we have the greatest confidence in its longevity. We would hope and expect that we can move to a position where the electronic copy is the preservation copy, because of the many advantages that brings in having the material in an electronic form.

Lord Hollick

199. Are you proposing in your submission that the right of legal deposit extends to electronic publishing, and that you should then distribute it on commercial terms so that you would make some payment back to the owner of the copyright?

A. No, we have been very clear to focus on the issue of collecting the material for future generations so that it is available when it is no longer available commercially. We have had discussions with the publishers and the content providers about these proposals. They would naturally be concerned if the legal deposit copy were to destroy or in any way damage their legitimate commercial interests, therefore we have put in our proposal, with the assent of the publishers whom we have consulted, that a copy of the electronic publication should be available for viewing, if you like, in one of the national libraries, but that it would only be made available on the highway at the time it came out of copyright, or earlier with the agreement of the copyright holder. We would expect that in several instances the publisher might be very willing for the library to make it available as another channel to the market, where the library would collect a royalty payment and pass it back to the publisher, but that would be for negotiation.

Baroness Hogg

200. Forgive me if this is dealt with in your submission, but two points rise to my mind immediately. One is that as publication along the superhighway becomes more and more a matter of multi-media publication, where do you draw the line of storage as it moves from words on screens through to moving or interactive images?

A. I think we recognise that it is becoming impossible to draw that line, and certainly one cannot in any statute provide the sort of definition which could cover all eventualities many of which we cannot foresee. We already have many multi-media publications which would legitimately be regarded as publications proper for a library which, a researcher might wish to consult, and which could include moving images, and sound, as well as the printed word. So we think that the legislation needs to enable a very wide definition of publication to be enacted, but that there would need to be some procedure to decide in particular circumstances what really fell within and without that definition.

201. I am ashamed to say that I simply do not know whether every television programme, for example, has to be deposited with you. Does the present right extend to every television programme?

A. It does not, no.

202. So if you were moving into this area you would potentially be creating some quite odd divisions between deposit and non-deposit in terms of moving images?

A. We are proposing that, for example, television broadcasting should be included.[9]

203. All television broadcasting?

A. All television broadcasting not covered by other Acts. What we would not be suggesting, of course, is that the British Library would necessarily be the appropriate place to hold all those programmes.

204. I understand that. If you look at how many books are published each year—which is about 60,000 to 65,000—when you are moving into this area obviously first of all the numbers begin to look enormous, and secondly there are two features, are there not, which concern one a bit? One is that because electronically published material is easily additionalised, if you like, from day to day or from moment to moment, how would you deal with the deposit problem in relation to that? Does every change to a document need to be separately deposited with you so that you have an audit trail through a massive number of changes in the document? Secondly, where do you put your bottom cut-off point below which this is not to be considered either permanent enough or substantial enough to be considered a publication?

A. I think that both of those are very real issues, and we have not answered finally all those questions, particularly the first one of how one deals with a dynamic database which may be changing by the second. How could one possibly keep an audit trail of such a database? Although I understand, for example, that the Meteorological Office does precisely that, so they in that sense have met that challenge. I think Ordnance Survey may also do that. So it is possible, but it obviously requires particular skills, expertise and requirements to do that. We have suggested in the first instance—because some of these questions will need a lot more exploration—that the legislation immediately should be confined to what we have called hand-held electronic devices, a CD-ROM, something that is portable, whilst we study further with the publishers and others how we would tackle the issues arising from archiving electronic journals and dynamic databases. On the matter of coverage, it was quite interesting that in the discussion last week in Paris there was quite a wide range of views of what, for example, the scientific archive should house—should it be restricted to strictly peer-reviewed journals or should it extend to every jotting that a scientist made on the superhighway on a bulletin board? I think there was clear agreement that the priority requirement is for genuine peer-reviewed electronic publications, but there are those who would argue that it should go much deeper than that, and indeed technology would allow it to go much deeper than that. I remain to be convinced that the system would not just collapse under its own weight if one tried to collect every jotting that everyone ever made.

Lord Gregson

205. Could I ask some questions about the technology of your archive. The Royal Ordnance Survey was mentioned. That is completely digitised and it was digitised for defence reasons and a lot of money was paid for that. How many, if any, of your archives are digitised? It leads to a very fundamental question, of course, in the end.

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[9] We are proposing that new legislation should be all-embracing and should incorporate all non-print items published or shown or played or otherwise communicated to the public in the UK, not covered by other Acts.

Lord Gregson *contd.*]

A. Yes. In a literal sense, none of our archives is digitised in the sense that they have not come through legal deposit. However, we hold a lot of digital material.

206. Who digitised it?

A. We have acquired digital formats. The biggest example we have is patents. The patent communities of the world now publish patents in digital form as well as in paper form. In a few years' time they will only publish in digital form. So for example, we have a collection now of 1 million plus patents, probably 10 million pages, which we hold in electronic form, and this is able to meet the substantial demands of our users for the patents they want to look at.

207. One has to be careful, of course, because you get electronic analogue recording, standard analogue recording which is electronic recording and can be held electronically, but it is quite different from digital, so one has to distinguish between the two very carefully.

A. Yes. I was specifically, in responding there, referring to digital recordings where we have digitised images.

208. Eventually you are going to have to digitise everything, are you not?

A. It would be rather nice to digitise everything. I think it would be rather formidable to digitise everything.

Lord Gregson] You are going to have to do it, though, because it will no longer be on paper, otherwise you will not be able to store it, will you?

Lord Flowers

209. Could I pose a question in a rather old-fashioned form? You can translate it for yourself into superhighway form. In Internet language it seems to me obvious that people are going to be publishing papers which are in hypertext, that is to say, they refer to other papers. If you are now archiving a hypertext document you are reliant upon other people's archives for some of the things referred to?

A. Yes.

210. How are you going to go about that problem of ensuring your archives have some integrity when they are so dependent upon everybody else's?

A. Again I have to confess, my Lord Chairman, that that is precisely the sort of question for which we do not have yet precise answers, but it obviously will require at some level some linkages and pointers to other holdings, be they in our own archive or archives across the world, but that will require a good deal of international co-operation to bring that about and a good deal better understanding of the techniques that will be required to do that.

211. Is there any effort devoted to that at the present time?

A. Not that I am aware of.

Lord Haskel

212. We do seem to be arriving at the question of preservation. You have explained to us how important it is to archive science in electronic format for future generations but, of course, as you have said yourself, the technology of the archiving is changing all the time. Lord Gregson spoke about digitisation. When the present system is obsolete, how are we going to be able to access the material that we are archiving at present?

A. Clearly we would not wish to end up as a museum of outdated software and outdated hardware. We therefore see it is going to be essential to translate the current electronic format, whatever it may be, into a generic format with some software shell which will enable that to be accessible in the future. Again I think the technology, the techniques associated with that, will be complex but I think they are not unknown, or unproven.

Lord Butterworth

213. What do you think is the most important service then to be pressed in order to get the information superhighway widely used in everyday life?

A. I do not think there is one single or simple answer to that.

214. In your paper, of course, you mention three possible interventions by government, do you not? Is there anything on that that you would like to say something further on?

A. I think that we genuinely do need to make the network more pervasive. We do need to increase the takeup of the network amongst schools, amongst hospitals, amongst public libraries and amongst the public at large. I think the point was made in the earlier presentation by Mr Bowes that the market, the content providers, will follow, if it is confident.

215. In your list in your paper you included Citizen's Advice Bureaux. Do you regard that as involvement?

A. Yes, indeed, I think so for the points that were being made by Lord Gregson earlier. Again we have a network in the country of physical locations where many people go to seek advice. So I think it parallels the public library in that sense. They are both networks of physical locations where the public can go and expect to receive information, that the information superhighway will be one further means of getting that information.

Lord Hollick

216. You sound a warning in your paper that we might not exploit the opportunities which arise from our traditional strengths in publishing and so on. You have highlighted in the paper you have just discussed two or three possible initiatives which are making the Internet, the information superhighway, more widely available, which we might characterise as infrastructure as a solution. Are there any content-related proposals that you have?

A. I think the content-related proposals would follow mainly from the development of that infrastructure. I think the other things where government necessarily has a role in relationship to content provision are in matters such as intellectual property rights, data security, privacy laws,

Lord Hollick *contd.*]

encryption techniques, and means of handling cash transactions securely across the networks. All those are issues where I think inevitably governments have to get involved. There are also issues where it is critically important for the information providers or the intermediaries that the national laws are consistent with one another internationally, and I think we are quite a long way from that. So there is action required, I think, at an international level to address these issues and arrive at solutions with which the content providers are comfortable.

217. So legal framework and copyright is the area that you would focus on?
A. Yes.

218. You do not think the government should be taking any particular steps to encourage the development of content for the superhighway?
A. I think the training and awareness issues referred to earlier are quite important, that if we can get people to understand that the information superhighway is here, is being used massively, is growing massively, is not going to go away, is a market opportunity, if they can be reassured about some of those issues I referred to earlier, such as data protection, privacy and so forth, then I would think the market would respond.

Lord Gregson

219. A lot of "hype" is being attached to the superhighway, the international superhighway and so forth. Is it not necessary to develop an Internet in the United Kingdom of some quality for use in the United Kingdom, as JANET or SuperJANET are developed at universities, as a necessary building brick before we make use of the superhighway? Is there not a need for a dedicated United Kingdom Internet?
A. I am not convinced that there is a need for a dedicated United Kingdom Internet. What I am convinced about is that there is a need for greater access to that telecommunications Internet infrastructure to a greater number of people. I do not think that it necessarily follows, that it has to be done by a dedicated United Kingdom Internet.

220. Superhighway is an Internet of Internets?
A. Yes.

221. Is there a core Internet in the United Kingdom which is capable of standing up to the international competition on superhighway, as there is in the States? There are several large Internets in the United States. The only one of any quality in the United Kingdom is JANET, is it not?
A. Yes, and I think SuperJANET is of very high quality.

222. For certain purposes?
A. But that is restricted to the academic community in the main. The British Library is one that does enjoy connection.

223. Therefore, is there not a need for a wider Internet in the United Kingdom before we start crying out for access to the superhighway, because we are offering nothing at the moment?
A. I am not sure if we are just having a semantic problem here. What I am saying is that I think there is a need for citizens of this country and for major institutions in this country to have access to SuperJANET or something like SuperJANET. Whether that means that SuperJANET itself is that United Kingdom net is I think of secondary importance. The importance is that those connections are made.

Lord Craig of Radley] Are you talking about access to SuperJANET there because it is a network or because of its content?

Lord Flowers

224. Or because of its speed?
A. All those factors. I think the key point about it is that it provides you with access to a huge amount of information which you might need, and in the future a lot more information, and it does that very quickly.

Lord Craig of Radley

225. That perhaps then leads on to my next question, the difference of approach, as to whether one should be seeking to provide universal access or whether one should be trying to make the information superhighway more intelligible and user-friendly but not yet universal. I would be interested to know what your view is on this, what we should be doing to achieve one or the other and what studies the British Library have done in this area?
A. I think they have to go hand in hand. There is no point in providing widespread access to a system which people do not find easy to use. Therefore, I think it is essential that the two things are tackled together. We ourselves have done quite a number of studies to understand how we present our information to users of the British Library. That has revealed not that there is one simple way of presenting the information; what it has revealed, not surprisingly, is that the way the information should be presented depends critically on to whom you are presenting it, for what purpose and the characteristics of the material which is being presented. So, for example, what we might present to a researcher in Glaxo who wants to find out what the latest research is on brain tumours can differ quite substantially from the way we would present information to a scholar who is coming into our reading rooms to research medieval maps. So I think it is very much a matter of understanding the market, understanding the data which you are trying to get to the market and tailoring the presentation in an appropriate fashion.

226. In other words, it is very much a concentration on what you might call the customer end of this telescope?
A. Yes.

227. Also what he hopes to see when he enters the superhighway down this electronic telescope?
A. Yes. I do think also that there are specific roles to be played, particularly if we go back to science where traditionally we have had the learned societies

Lord Craig of Radley *contd.*]

putting a great deal of effort into indexing the literature of science, so that in the print-on-paper mode we are able to find articles of interest. The learned societies and other scientific organisations are going to have to rethink that mapping and indexing to enable that searching to be more effective in the electronic media. I am sure that there is more work which needs to be done there and will be done there.

Baroness Hogg

228. That leads on very clearly to my next question. Picking up the point you make in your evidence about the need to achieve critical mass, starting from Lord Craig's end of the telescope and the individual attempting to use a superhighway electronic system of some kind, working one's way through, they encounter a set of problems. One of the problems they encounter is to do with speed. That is to do with technology, it is to do with switching and so forth. The second problem which you have been talking most interestingly about, if I may say so, is the kind of problem with the publishing function and how you provide the material, how you display it, how you understand your market. Then problem number three is whether the information is there at the end of the day in some form, whether the content is there up the chain. I should add to this package also, of course, whether the whole service is being marketed effectively. What do you see as the key problem in achieving growth of market and critical mass?

A. It would seem to me that the biggest inhibition at the moment is the cost to the individuals or the institutions concerned. Our own experience on making material available is—for example, I think we quoted the *Beowulf* manuscript, in the submission we made - by digitising that and putting it on the Internet, clearly we were able to make it much more widely available than we ever could by having it sitting in a showcase in our reading rooms. It has been seen by presumably tens of thousands of people by now since it went up. So there is no problem in actually attracting use of the material. I think we quoted the figure of 1 million accesses in the first six months of the new Portico system when we put it up. Clearly, though, that system is confined, and must be confined, to those who currently have access to the network, so in the main it will be academics who are making that access and not the public. Your question is, why are the public not subscribing, why are they not making those connections? I can only think that at present they do not see a sufficient range of materials available to them to make it worth their while subscribing and paying for the cost of connection.

229. I am sorry to interrupt you, but rather than that, it is difficult to access the system and to access the material, because it is unfriendly, because the publishing function is ineffectively carried out, or because the system is so darned slow that they get fed up.

A. I am afraid to say that when it gets down to the connections in the home, the connections are often very slow, with the problems we were talking about earlier of connecting to America. America just does not exist in the afternoon as far as the United Kingdom is concerned. I think it is probably the same if you are in the home, that if you are trying to pull down anything with a lot of data—and even the *Beowulf* manuscript has a lot of data in it—it will take a frustrating amount of time to get that delivered successfully to your home, unless you have a very significant band width in your home, and not many people have.

Lord Gregson

230. What sort of costs are we talking about? What subscription do you charge?

A. Subscriptions to commercial services for e-mail, as provided, for example, by CompuServe—and BT have just announced one this morning—typically run, I think, at a rate of about £15 a month.

231. What do you charge for access to your system?

A. We are providing access to our system free at the moment.

Baroness Hogg

232. But someone will have to provide a service provider to get through to you?

A. Yes.

Lord Gregson

233. I understand that.

A. We are not charging for access at the moment. As I say, if we were to develop that to the point where it was used on a significant scale so that the costs were very significant, then we would have to address the issue of pricing, but at present we are doing it as an experiment, as a learning process, and we are providing access free.

Lord Craig of Radley

234. In other words, this is putting your toe in the water?

A. Exactly.

235. To see what sort of customer base there might be out there?

A. Yes.

236. Assuming there is a reasonable customer base, do you in fact envisage that in order to continue to provide that material you would then have to put it on a commercial basis and start charging?

A. I should make it clear that we do charge for remote access to our collections, to the extent that we collect £30 million a year through that process. That service is primarily still through postal delivery of copies. Clearly we foresee the time when the majority of that delivery will be electronic rather than postal, and that will require a payment.

Lord Flowers

237. Could we talk about electronic journals for the moment, by which I do not mean newspapers but refereed, peer-reviewed journals on which the progress and reputation of a profession depends. Quite a number of journals are now available—slowly and not in the afternoon if they are American—but the whole thing has taken quite a number of years to get off the ground. I wondered whether you could tell us what really are the barriers to the growth of the electronic publishing of this professional kind or whether, in fact, there are no barriers at all except possibly cost?

A. I think the overwhelming barrier that we have seen thus far is the concern of the author, the scientist author, that publishing in an electronic journal will not give the professional reward and status that publishing in a traditional journal will give. So if you have the choice between publishing in one of the prestige printed journals that is well-known and established in a discipline or a new electronic journal, I think the evidence so far is that the scientist will choose the traditional medium because of the accreditation that comes with that.

238. The electronic journals that I know, and newspapers also for that matter, are Internet editions of journals which are produced in hard copy as well, so there that problem does not arise presumably?

A. That problem does not arise, as you say, when there is both a printed and an electronic version, but I thought the question you were really asking was, what is inhibiting the development of a pure electronic journal which does not have a printed form.

239. There have to be procedures clearly, such as peer reviewing and so on, but that can be imposed electronically as well?

A. Yes.

240. One has to publish in journals of repute, albeit electronic. How do you guarantee repute? How do you guarantee authenticity and things of that sort? Are those problems?

A. I must say I go back to the first problem, that we have not yet overcome the hurdle of the contributor, the author, recognising a new, purely electronic journal as sufficient, giving him sufficient reward in terms of status. To overcome that, I think it first of all requires a reputable publisher, be it the Royal Society or a body of that standing, and then it clearly requires everything that is associated with a printed journal: a reputable, authoritative editorial board, a critical refereeing process, good editorial standards and attention to quality control and presentation. I think all those things are going to be essential if electronic journals are going to flourish. The evidence so far is that they have been very slow to flourish because people have not contributed. I think another useful factor could be—and I think some steps have been made in this direction—for the Funding Councils when undertaking their reviews of research assessment to ensure that they take account of electronic journals as a legitimate publishing medium in making their assessments.

Chairman

241. There are well authenticated examples historically in rapidly moving scientific fields, molecular biology in the 1950s, for example, where groups of people corresponded in the DNA Club, for example, in a semi-private way without any authentication, refereeing, anything, just throwing ideas around. That kind of thing is actually happening on the Internet at the moment in some fields.

A. On a very large scale. I think probably the prime example is in nuclear physics, the centre at Los Alamos, where they have quite a substantial archive of that kind that has now been built up over the past four years, which I believe is being accessed 2-3,000 times every day. So there are certain disciplines where that really has taken hold. But I am not sure that anything that has happened, for example, at Los Alamos in the nuclear physics area has had an impact on the traditional publications of nuclear physics.

Lord Flowers] You would not quote publication in those group reports as part of your CV, would you, when applying for a job?

Chairman] But your contributions would affect the kind of people who might referee your applications for jobs. They are not insignificant, I think.

Lord Gregson

242. Los Alamos is an international database. It is not just what Los Alamos are producing?

A. Indeed.

243. The Japanese are one of the largest customers of the Los Alamos database. I used to be a customer myself. Is there not a problem here of chicken and egg? Does it not have to have enough customers? The BBC fell flat on their face when they tried to do it on a medical basis. They published three journals on the basis of doctors' takeup and there were so few doctors that they have now dropped it. Maybe it is an application for the medical profession rather than the publishing situation, I am not sure which.

A. I think it also probably requires an application where the electronic medium is particularly appropriate. If you have a discipline where embedding some of the data in electronic form within the journal becomes a critical way of presenting the results of that particular piece of research, it is at that point that if it is really adding value to the process I could see that it could take hold. So if it was critically important to have some crystallographic data embedded in the text, and that could only be done in an electronic version, then it would make good sense to create an electronic journal for that purpose.

Chairman

244. We are in some danger, Mr Russon, of enacting Haydn's Farewell Symphony at this stage! Nevertheless, I wonder, could you give us a brief comment on what you think the government's priorities should be, since you are to some extent critical of what is going on at the moment?

A. I think I have already given you an indication, my Lord Chairman, of what our own particular priority is because that is something which is very

Chairman *contd.*]

much in our mind at the moment, the legal deposit issue which I have talked about at some length. I think next I would put in importance the issue of raising awareness within government, within industry and within education of the potential of the superhighway and the need for all of us to work together to ensure that we can exploit it for Britain. As I think I said earlier, and I think we said in our evidence, we should have every optimism that Britain can come out of this very well, simply because we have a superb publishing industry, we have very strong media companies, we have probably one of the best library and information networks in the world and we have the English language. So I think we have everything to play for, but we have to find ways of getting all parts of the community thinking about how it is going to affect their particular interests and lives.

Chairman] Thank you very much indeed.

TUESDAY 5 MARCH 1996

Present:

Butterworth, L.	Hogg, B.
Craig of Radley, L.	Hollick, L.
Gregson, L.	Phillips of Ellesmere, L. (Chairman)
Flowers, L.	
Haskel, L.	

Memorandum by the National Council for Educational Technology (NCET)

1.0 ABOUT NCET

1.1 The National Council for Educational Technology (NCET) is an independent charitable company, limited by guarantee and a non-departmental public body (NDPB) funded largely by the four UK departments for education: the Department for Education and Employment (DFEE); the Welsh Office Education Department (WOED); the Scottish Office for Education (SOED); the Department for Education Northern Ireland (DENI).

1.2 NCET is established to be the principal focus for expertise in teaching learning with new technologies across the sectors.

1.3 The main purposes of NCET are to:

(i) identify the relevance of new technologies to education

(ii) evaluate their potential to enhance learning and raise standards

(iii) promote, enhance and support the effective use of IT across all sectors of education.

1.4 NCET fulfils its purpose by gathering intelligence from a wide range of sources both commercial and educational and, runs small, medium and large-scale projects. Advice is provided to central and local government, educational bodies and practitioners in a variety of forms: conferences; seminars; hardcopy publications; electronic information, TV programmes. For an electronic view of some of NCET's information on the Internet/World-Wide Web, type: http://ncet.csv.warwick.ac.uk.

1.5 NCET manages large-scale national projects for government departments. Currently on behalf of the four UK departments of education it is managing the evaluation of 21 of the broadband pilot projects that make up the Education Departments' Superhighways Initiative (EDSI). See annex.

2.0 DEFINITION

2.1 NCET would like to suggest a modification to the definition given in accompanying papers of the term "Information Superhighway" to read "a publicly accessible switched, digital network, capable of transferring large amounts of information in text, graphical, audio and video form at high speed between users." This more accurately reflects the future shape of the required UK network. This advice is based on our experience with the EDSI and other pilot projects in information and communications technologies.

2.2 The term "broadband" network refers to the capacity of a (digital) channel for carrying large amounts of data; a generally-accepted threshold for this is a data speed of 2 Mb/s which can be delivered over a variety of transport media.

3.0 What is the current form of the Information Superhighway and how is it developing (i) in the UK and (ii) world-wide? What specific problems arise from incompatible network standards and why are these incompatibilities arising?

3.1 NCET's concern is with education and training and to date, there is only one educational "broadband" ISH operating in the UK which meets the above definition and that is SuperJANET funded through the Higher Education Funding Council. The potential however, exists for a much wider national ISH. For instance, BT already has thousands of miles of trunk network laid as fibre with System X digital exchanges, but considerable investment is needed to extend that to all of their residential and commercial subscribers. Cable television companies have working networks installed in their franchise areas, but to date these are mainly analogue carrying one-way television with telephony. Re-engineering is needed to develop switched digital interactivity although some companies are planning this and cable modems offer exciting possibilities and will be evaluated via EDSI. (See annex).

3.2 Developments in compression and technologies such as asynchronous digital subscriber line (ADSL) mean that much higher bit rates can be achieved over traditional copper twisted pair wires and BT is currently investigating this with trials in the Colchester/Ipswich area.

3.3 World-wide developments. Outside NCET's competence at present.

3.4 Varying and in some cases incompatible network technologies such as ISDN, ATM, ADSL can appear bewildering; this is further confused by the continued rapid development of compression techniques. It is NCET's view that rather than focus on technical standards for the ISH, it is preferable to think of network characterstics such as:

- high/medium or low bandwidth
- switched or broadcast/narrowcast
- constant bandwidth or on demand
- symmetrical (same bandwidth upstream as downstream) or asymmetrical capacity.

3.5 In broad terms we recommend that the educational information superhighway of the future in the UK should be:

— open	access by users should not be limited to one hardware platform, one software route or one service provider
— interoperable	content providers should be able to make their products/services available over different networks without significant additional cost and effort
— switched	allowing different information to be routed specifically to unique addresses
— user-friendly	interfaces should be simple, capable of being appropriately tailored for education and the underlying technology transparent
— affordable	costs should be controlled and predictable to educational bodies. Tariffing system should encourage and not discourage widespread use

3.6 In addition, users such as schools should have network connections which offer at least wideband access as part of a universal service (64Kb/s) in both directions with the option of higher rates if they choose to pay a premium.

4.0 *What services are being provided, and should be developed/will be required within for example the following areas: public information; commerce; finance; education; industrial training; health; social services; entertainment?*

4.1 NCET's response will be confined here to education and industrial training taken as one category.

4.2 Currently the most widespread and developed network is the global Internet which offers a range of services and resources useful to education and training. It is important to remember however, that large and impressive as the Internet may appear, it is but a glimpse of what services and networks may be available in the future with fibre and true broadband switching technology. At the time of writing (Jan 1996), probably over 3,000 schools and colleges in the UK have connections (mostly via dial-up over normal telephone lines) and NCET research conducted in the context of a project with the BBC Networking Club shows that the most popular services are e-mail and World Wide Web access (W3) which offers many benefits for teaching and learning.

4.3 E-mail offers the possibility of communicating directly with other people and organisations around the world, working on collaborative projects and accessing expertise not usually available. W3 through graphical browsers such as Netscape puts the resources of tens of thousands of databases around the world at the finger tips of teachers and learners, through a simple file-transfer operation. An introduction by NCET to the Internet for schools and colleges in the UK can be found in electronic form at the URL mentioned above (hardcopy enclosed). This contains lists of useful Web site addresses by subject area and is regularly updated in a way that hardcopy cannot be.

4.4 While access to information such as is contained on the W3 is generally free at the moment, providing Internet services to schools and colleges outside the JANET HE network is a commercial business. Recently we have seen the development of educationally-oriented Internet service providers (ISPs) such as Edex, RM's Internet for Learning, BT's Campus World etc. These providers offer services for schools and colleges and offer a protected area or "walled garden" in say a Netscape environment of educationally suitable sites with useful subject materials. These services usually provide a reasonable amount of protection against undesirable material.

4.5 Apart from the services currently offered by the Internet, there are other services which are worthy of note.

4.6 Conferencing/bulletin board systems such as First Class are increasing in number, and are often being used for distance teaching as with the Open University post graduate certificate in education course. There is considerable potential here for increasing access to education and training for groups and individuals hitherto excluded, or who need support and contact over a distance at times to suit themselves. The in-service training of teachers is an obvious example of just one potential application.

4.7 We are also witnessing, on a small scale, the development of desktop video conferencing over basic rate ISDN, utilising PCs with some additional hardware/software and a small camera. Desktop conferencing, which includes two-way transmission of voice, video and data, is potentially a very powerful application for education, since it offers the integration of the above media and means that applications and data can be shared over the screens of linked computers, making an effective learning environment irrespective of distance. Systems based on this technology could link small groups of learners in (for example) dispersed schools with an expert tutor based elsewhere. Some further education colleges are trailling these systems to deliver training over a distance on employers' premises.

4.8 In the distance learning area generally, there will be a commercial opportunity for the provision of learning materials to schools, colleges, training centres and the home. The nature and characteristics of these materials will depend on the characteristics of the network available to carry them, and there will have to be payment systems developed to encourage publishers and developers to enter this potential multimedia market. This will entail a culture shift away from the "free" information available currently over the Internet which currently is one of its great attractions, but ultimately may limit the quality of its content for education.

4.9 In order to benefit from these applications, educational bodies such as schools and colleges do need a higher level of basic telecommunications service and NCET will be responding to the OFTEL consultative document on this in detail. In general terms the sorts of services that are needed by the education community include the following. In order to relieve the pressure on small schools to provide their own IT support, technical support and materials/applications provision could be outsourced and delivered over the network. Teachers and lecturers will need more targeted multimedia training an curriculum-based materials, including support materials to media "raw" content. Another service needed is advisory information on the integration of IT and networks into normal curricula and training programmes together with the delivery of training in how to use networks and applications for teachers, lecturers and trainers. There is considerable potential over networks for administrative and management support systems for schools. Finally, particularly in the post-compulsory sector, there will be an increasing demand for services that offer distance learning/training. More detailed information on broadband services for education will emerge from the evaluation of the EDSI referred to above. The final report on this will be available sometime in the middle of 1997.

5.0 *Who will supply these services to consumers in the UK? How can the participating companies be categorised and what is the nature of the commercial relationships between them? How are suppliers likely to develop? What service standards exist and how are they likely to evolve?*

5.1 Companies providing services in the telecommunications market can be divided into five categories:

- hardware manufacturers making access devices and components eg desktop/portable computers, PDAs, mobile phones
- network operators owning the network, eg BT, cable companies, cellular phone network operators like Cellnet
- service providers selling-on access to the network and providing value-added services and billing arrangements
- content providers who create and make information available
- software developers creating software to run over the networks.

5.2 Some of these companies fulfil more than one function however, as with BT which is pursuing a strategy of vertical integration.

5.3 As regards a model for operation and development, one looks to existing networks and services such as cable television, the Internet and other on-line services and sees global content mediated by more local (national or regional) organisations. What is important for education and other sectors, is that the networks should be open to content from a variety of sources and that operators should not use their monopoly position to restrict access to certain content developers.

5.4 On the question of service standards, there are none currently for education and training, although the OFTEL consultation will be looking at elements needed for a universal telecommunications service to schools. The only standards that exist are *de facto* technical ones relating to hardware, software used and network protocols. On the technical side NCET believes that education should follow agreed international standards.

6.0 *How can universal access to service provided for the common good be secured within a commercially competitive market framework?*

6.1 The OFTEL consultation on universal service will answer this more fully for the schools sector later on this year, but what is being considered is a higher level of telecommunications service for schools required of all operators through the licence mechanism with the difference between the true costs and the price schools can realistically pay being funded by a universal service fund (so-called pay or play). Ideally, educational organisations should be able to choose between different infrastructure providers and service providers, both of whom offer services to an agreed basic standard. It is recognised however, that competition in the provision of infrastructure is a longer-term goal, given the pre-eminent position of BT and the lack of coverage provided by other network operators.

6.2 Par 3.5 above lists the characteristics of the network needed for education. NCET believes that some of the elements of a universal service to schools and colleges should be: affordable tariffs with a higher element of fixed costs to facilitate budgeting; free local calls during the school day; itemised billing; selective call-barring; and connection at varying speeds above the minimum of 64Kbp/s if schools and colleges are prepared to pay.

7.0 *What is the role of central Government in connection with the "Information Superhighway" service provision, including the following areas:*

7.1 *leadership*: there is a need for central government to fly the flag at national level for UK developments in the ISH. One way in which this could be done is to identify one senior cabinet minister to act as a "UK Al Gore" and be a focal point articulating the vision, co-ordinating the sometimes diverging departmental initiatives, and having an eye to international developments, particularly those arising from the European Commission.

7.2 *promoting inward investment*: this is an area in which central government can be effective in terms of maximising systemic effectiveness and removing general barriers. For instance, the weighting given to funding for further education through the FEFC formula should not discourage colleges from expanding open and distance learning, which is an area which lends itself for delivery over the ISH.

7.3 *promoting and safeguarding the interests of UK firms world-wide*: beyond NCET's remit.

7.4 *promoting network compatibility*: there is a clear role here to ensure that we do not end up with a patchwork quilt of incompatible local and regional networks.

7.5 *access to government information*: government has already started with the W3 server run by the CCTA (open.gov.uk) and we certainly need more parliamentarians on-line, but the government should also be willing to accept information in digital form from others and set an expectation. This is starting with the DFEE which regularly receives Form 7 data from schools and LEAs by EDI.

7.6 *security of payment*: beyond NCET's remit except to point out that until there are secure payment systems for access and services, commercial-quality educational material over networks is unlikely to be available since companies will have no financial incentive to enter the market.

7.7 *Data protection, confidentiality and censorship:* the protection of intellectual property rights is important for the reasons given above and there is much work to be continued in this area by government to reconcile the conflicting demands of free access and exchange of information from end users and restriction to protect the rights of providers. It will be very difficult to police the ISH as can be seen from the Internet and legislation may need to be updated to take account of new media. In this context it would be helpful for government to clarify its position regarding encryption technology, which is an obvious way of protecting information. In education, the key to dealing with undesirable material is not censorship, but user education and constant vigilance on the part of schools, colleges and in particular, network managers.

7.8 *Verification of information:* outside NCET's remit.

7.9 *Promoting the development of UK software:* in the era of the ISH, all software, including software for education and training needs a global market to provide a return on investment. While the UK is potentially well placed for global competition, few companies possess the marketing expertise to capitalise on their products and services in this area. It may be that some seed-corn funding from the DTI could stimulate UK providers here.

8.0 *What is the role of local and regional Government in connection with the "Information Superhighway"? How can new services be used to boost (a) the ongoing regeneration of urban areas, (b) other local economies?*

8.1 Local and regional authorities can play important roles in developing the ISH and in bringing services tailored to specific local needs. An effective implementation model is that of partnership between public and private organisations eg, LEAs, TECs, economic development agencies, network operators and hardware providers etc. There is funding available from UK and European sources for imaginative schemes which use telematics for instance to deliver training in IT skills to local communities including the unemployed, in order to raise the skill base of UK PLC.

8.2 A good example of this is the Cumbria CREDITS scheme funded partly through the single regeneration budget (SRB) which is using networked local primary schools as one base for the delivery of training in IT to local communities.

8.3 It is important, however, that local and regional agencies themselves become the providers of information on education, training and investment opportunities to local communities and businesses to stimulate development. One then needs network access points in as many schools, colleges, local libraries and community centres as possible.

8.4 Finally here, as with central government, local government itself could become more transparent and open by greater use of networks if there were access to both elected members and officers. There is no reason for instance why committee minutes should not be available on a local government server for all to see.

9.0 *What will be the impact of the "Information Superhighway" on working practices and employment prospects?*

9.1 The implementation of IT has generally caused the loss of jobs in some sectors and the creation of new jobs in others (eg 40,000 new jobs in Germany in the mobile phone market alone according to Commissioner Bangemann). It is likely that the ISH will continue this trend, which is to flatten large organisations and create smaller virtual enterprises providing services over larger geographical areas.

9.2 The ISH will allow more home-working by independent skilled knowledge workers who will use the net to work in virtual teams with people all around the world, but there is a concern about those people who do not have the necessary IT skills and general ability. This is an important public policy issue since IT and networks are likely to exacerbate existing social divisions and maybe create new ones.

9.3 It has to be said though, that in the future not all jobs will require high levels of IT skills. It is difficult to imagine a virtual plumber, dentist or hairdresser, but there will be a premium on developing network literacy for the high value jobs which we want in the UK. This is an important role for education.

9.4 In the education market, the implementation of the ISH will provide opportunities for new entrants, bringing new jobs. It could be at a cost, however, to existing posts in schools and colleges as new training deliverers and information brokers emerge offering services directly to people at home or in the workplace. The impact on existing jobs could be particularly felt in the post-compulsory sector ie in colleges of further education, as their training markets are eroded by new entrants.

9.5 In schools in the longer term we may see the overall decline in the numbers of teachers to pupils in favour of more adults with different skills, such as network technicians for instance or resource managers/librarians. The trend could be towards fewer, but more highly IT qualified teachers managing the work of other skilled adults involved in the learning process.

10.0 *Is the dominance of mass-market US software a threat or an opportunity? What hard* commercial *initiatives can be made (as opposed to "collaborative" ventures such as RACE or ESPRIT) to respond to this dominance?*

10.1 The international language of IT and networks is English so the UK should have a head start in commercial opportunities and there are some new market entrants with excellent products and services. However, as has been stated above, UK companies' quality in products and services is rarely matched with the necessary global marketing skills. One exception to this may be On-Line Media with its Applied Risc Technology which is already well positioned in the set-top box and personal digital assistant (PDA) markets world-wide.

10.2 There will be large opportunites for UK content providers and application software developers to produce for this global market. Multimedia software and CD ROM developers may need help and encouragement to version their existing and future products for the ISH, but it must be repeated that expertise in the UK will not necessarily carry through onto the global stage without marketing skills and possibly some government help.

APPENDICES:

Snapshots of superhighways projects and list of the educational comms projects. Hard copy of Highways for Learning to go with the response.

SNAPSHOTS OF SUPERHIGHWAY PROJECTS

Roger Blamire, NCET November 1995

A desktop-to-desktop managed network based on broadband technology for the delivery of on-line interactive education services and applications. It covers the whole curriculum, with a particular focus on English, mathematics, modern foreign languages, science and art. The provision of specialist and minority courses, initial and in-service teacher training, streamlining of administrative costs, and sharing of resources between primary and secondary phases will also be features of the project.

A project using photographic and digital technologies actively involves children at Key Stages one and two in creative explorations of personal and global histories. In curriculum terms, the project will support history, geography, English, Art and IT. The children will produce a multimedia programme using images, text, music and voice for distribution over the Internet using broadband links.

A project focusing on English and modern foreign languages carrying broadband cable television and data over the cable system at rates up to 10 Mbit/s. This will potentially offer access to the Internet at high speed and to a CD-ROM server.

A project covering all National Curriculum subjects, in-service training, home learning and the provision of minority language support. Among the technologies are cable networking providing a minimum speed of 2 Mbit/s, and Integrated Learning Systems.

A project to alleviate the problems facing small rural schools by the use of desktop conferencing as a tool for teaching and learning and curriculum and staff development. There is a programme of staff development and participation in working groups developing additional curricular material for the new medium.

A project enabling primary, secondary and special schools to use digital connections to share in the development of a World-Wide Web server. Pages will be cross-curricular in nature, involving the use of IT, English, Welsh, Art and Design as well as focusing on local history and geography.

A demonstrator project combining broad and narrowband technology for the delivery of learning materials and associated staff development. The main aim of the project is the evaluation of a network to support and challenge able pupils in remote rural primary and secondary schools. This will lead to the development of a collaborative learning environment to support simulation and problem-solving approaches to learning and teaching in mathematics, technology and language.

A project to provide support to teachers to introduce remote sensing to enhance the teaching of Geography at Key Stage three and above, and to provide remote sensing in-service training as well as on-line access to a large archive of remotely sensed images, image processing software and on-line support to use them. The project also aims to deliver remote sensing enhancement modules to National Curriculum studies via ISDN. The pilot schools are to make use of simultaneous video-conferencing and data sharing.

A project to deliver GNVQ IT courses by the use of broadband technology and involving the use of video-conferencing, interactive multimedia teaching resources and narrowcast magazine programming via personal computers linked to a broadband cable network. A particular feature will be the linking of the schools and colleges involved to the business community.

Schools and colleges are being connected to a managed network, with ISDN facilities and an Internet gateway. The project will investigate the use of video-conferencing, the enrichment of the GNVQ Manufacturing programme, the enhancement of A-level Communication Studies, and the development of the IT skills of parents and others in the community.

A project to pilot curriculum development, the development of network literacy and the use of superhighways in education-business links.

A project uniting further education and schools into a centrally managed ISDN local network. It provides a basic introducion to telematics for year 11 pupils, curriculum enhancement for FE college students and a means of careers advice and guidance. Among the technical features will be ISDN, video-conferencing, video mail, shared use of CD-ROM facilities and use of satellite facilities.

A major project to develop a broadband network linking open learning centres which would subsequently expand to employer sites and centres of employment. The focus is on increasing the competitiveness of business within the region through access to flexible, high quality vocational training provision.

A partnership focusing on foreign language teaching in secondary schools and colleges. It involves one school each in England, France, Germany and Spain. Various technologies will be used, including ISDN2, voice conferencing, video conferencing and CD-ROM.

A project to deliver the curriculum at Key Stages three and four. Its purposes will be to raise attainment in education and training, and to increase participation by the adult community in lifetime learning, with an emphasis on "new literacy". The project will be based initially on the establishment of multimedia learning centres in schools with broadband links to each other as well as multimedia technology.

A project taking an existing in-service training course for one of the SIMS computer-based school management units, modifying it for distance learning use and delivering, supporting and assessing it using ISDN2 video-conferencing. The project will involve teachers, non-teaching staff and managers.

A project to establish a broadband network using ISDN30 linking a number of sites. The focus will be on teacher-designed work in curriculum areas and on the management of learning. Applications will include video conferencing, remote control and remote access.

A project based in schools and a number of homes includes the use of on-demand educational programming, and distance Integrated Learning Systems for homework and revision. It also explores the attitudinal, pedagogic and management implications of the superhighway environment for teachers.

A community of learning project based on schools and a number of homes focuses on GNVQ, English, Mathematics, Science, Geography and Design and Technology offering a trial of alternative dial-up and cable modem technology.

A project to pilot the feasibility and value of broadband technology to schools and homes focuses on language and cultural studies, and includes the use of a digital library, inter-school links, broadband Internet access and home-school links.

Focused on the use of on-line access to operating theatres for teaching purposes, this project involves the use of live interactive links to operating theatres. The link provides access to uni-directional video and bi-directional audio for demonstrations and interactive discussions with surgeons during operations.

A project to develop a system that allows teachers to find TV-based material more quickly than by current means and enable them to gain greater access to this material by fast targeting of appropriate programming and immediate delivery. The project will also pilot the on-line delivery of HE courses and in-service training on teaching and learning with multimedia.

UK COMMUNICATIONS PROJECTS

This selective list of current telematics projects in the UK aims to provide an overview of work in progress.

Comenius Project

Networking regional Comenius language centres via CampusWorld to provide enhanced local guidance, information and support for all aspects of teaching and learning modern languages. Project began in 1994. Managed by NCET in partnership with CILT and BT.

Education Departments' Superhighways Initiative (EDSI)

EDSI is a large scale national evaluation project looking at the educational and technical aspects of over 20 broadband communications projects of varying sizes and scope. It begins in 1996. The evaluation is managed by NCET (SCET in Scotland) on behalf of the UK Education Departments.

FE Internet Project

A pilot offering 12 colleges access to the Internet with three more organisations added by the end of the Autumn term 1994. Began March 1994 and has been extended until March 1996. The project is looking at the Internet as a resource for the curriculum.

First Class Pilots

Schools piloting Integrated Learning Systems are linked via First Class and modems to each other, to evaluators and NCET in a closed area for discussions. They are exchanging experiences by e-mail and to within the "coffee bar" and other bulletin board areas on the First Class system.

Learning Communities

A small project continuing the work begun in the BBC/NCET pilot 1994–95 (Information sheet available from NCET Information Unit or on the Internet at:

http://ncet.csv.warwick.ac.uk./WWW/randd/temp/bbcnc.html.

Schools are exploring the educational, technical and management issues raised by Internet access.

Libraries of the Future Project

A pilot project of 11 school and college libraries. It focuses on the impact of on-line interactive multimedia technologies on access to information and the change in learning processes. Phase 1 ran until March 1995 and access to the Internet was via modems for all schools. Phase 2 began May 1995 and runs until April 1996. In Phase 2 access is via ISDN for 9 of the schools. Phase 1 summary is available from NCET Information Unit. Managed by NCET

Lingu@Net—G7/European Dissemination Project

A five nation EC funded feasibility project to provide language teaching and learning resources on the NCET World Wide Web pages for educators and students. Project began in 1994. Managed by NCET and CILT.

SENCOs

Every UK school is required to nominate a Special Educational Needs Co-ordinator. The project, linking a number of SENCOs, aims to assess the usefulness of electronic mail for sharing problems and solutions and for communicating with the local support services and to explore the benefits of World Wide Web based SENCO pages provided by NCET. The project is funded by the Department for Education and Employment. Initial findings show that the most effective use occurs when SENCOs have easy access (eg a laptop at home), enjoy management support, are confident using the software and have time to go on-line. The project is ongoing. A summary is available from NCET.

Teletext for Learning Project

The project involves three primary and two secondary schools and an FE college. The schools have been provided with dedicated computers and software for the downloading of viewdata screens. NCET also provide teletext pages disseminating a range of ideas on using IT for learning. Project began early 1995 and ended August 1995. Managed by NCET. Funded by Teletext Ltd.

Argyll On-line

A pilot project organised by Strathclyde Regional Council with support from BT and Olivetti which offers video communications equipment to five primary schools. It allows children in remote areas to communicate and exchange documents and other work. The project may be extended to more than 70 primaries and nine secondaries in the area. Managed by Strathclyde Regional Council.

Brixton Connections Project

15 Brixton primary schools have access to a multimedia machine and the Internet. The project concentrates on the applications of e-mail and the World Wide Web. The project began in June 1995 and runs for three years. Managed by Phil Redman.

CampusWorld Projects

Building on experiences over eight years with Campus 2000, CampusWorld is BT's Internet service for education. A number of curriculum projects and on-line events are organised for learners in schools and colleges, including newspaper days, collaborative writing and research projects, science events, computer history conferences, language activities and more.

Chatback

An International project using e-mail across about 100 schools. Work covers all curriculum areas with an emphasis on special needs. The project began in 1987 and is ongoing. Four new projects began in September 1994. Managed by Tom Holloway.

Croydon Libraries' Internet Project (CLIP)

This project aims to find out how the Internet can be used as an electronic reference book while addressing technical and economic issues and offering public access. The project is funded by the British Library Research and Development Department (BLR & DD) and began in Autumn 1994 and will run until March 1996.

Dixons Schoolsnet

A project funded by the PC World computer stores giving four secondary schools in England and four schools in the US access to the Internet and email. The project, concentrating on local information such as geographical and environmental data, began February 1995. Managed by Dixons.

Education across Europe: Video conferencing by Satellite

This satellite video conferencing project sponsored in the UK by MATRA Marconi Space UK includes 12 Hampshire schools and colleges. Partnerships have been set up with schools in Austria, Slovenia and France, with transmissions via the EUTELSAT satellite including topics such as Geography, History and Languages. The project began in September 1992 and is ongoing and developing. Managed by Stan Spooner.

European Schools Project (ESP)

The project is the initiative of the Centre for Tele-Learning (CTL) and Faculty of Pedagogical and Educational Sciences of the University of Amsterdam in the Netherlands. It is now operating in 25 countries and over 300 schools. The ESP is aiming at building a support system for primary and secondary schools, enabling them to explore the various possibilities Internet offers for improving the processes of teaching and learning. Began in 1988 and is ongoing.

Exeter Multimedia Teaching through SuperJANET and ISDN

The project includes eight higher education institutions with connectivity to video-conferencing and the Internet via ISDN (later moving to SuperJANET). The aim is to see the effect of information technology on students work and the potential of multimedia for enriching education practices. Managed by University of Exeter.

Meteorological Four Seasons Project

This project links new education centres at National Grid sites with each other via the Internet. The project intends to allow children to compare meteriological and environmental information between the North and South of the country. The project is a National Grid initiative with support from the Department of the Environment.

GEMISIS 2000

Nynex Cable Comms and Salford Council are joining with the city's two universities to explore the interactive potential of a broadband cable network delivering local services in a community network. Managed by Nynex and Salford Council.

GeoTouch Project

This is a world-wide project involving 13 schools in Japan and 40 schools from seven different countries. The first session April-June 1995 divided schools into discussion group and compared the geography of regions and environmental problems in their area. The second session September-December 1995 will divide schools into groups to discuss different environmental themes. Question and answer sessions will also be held on the Internet.

Hertfordshire Ebenezer 2000 Project

The original project was an electronic conferencing and digital library system that was set up in 1988 and ran until November 1994. The new system will enable desktop conferencing, better electronic mail and link into the computerised library databases. There will also be a CD ROM subject database and eventually Internet access. The system will allow access to information for parents, teachers, pupils and the local community.

ITT Link

The first phase 1994-95 linked a limited amount of teachers and tutors involved in the Teaching Qualification in Computing at Saint Andrew's College, Glasgow. This was by using electronic mail and the First Class conferencing system. The second phase 1995–96 will be expanded to include all PGCE Computing students and hopes to encourage an important support network.

JANET and SuperJANET

JANET is the UK national research network of 200 higher education institutions and also gives access to the Internet. SuperJANET currently networks 60 Higher Education Institutions and is used for distance learning, group collaboration and remote access to information, teaching and expertise. SuperJANET uses a high speed optical fibre network. Managed by United Kingdom Education and Research Networking Association (UKERNA).

Jason Project

The Jason VI project used satellite, cable TV, computers and robotics to bring a live broadcast from the lava fields in Hawaii to the participating 275 UK schools at five sites and 22 North American sites. The broadcast also involved live question and answer sessions with scientists. The Jason VII project next year will focus on underwater life. Managed by the Jason Foundation for Education (US) and the National Museums and Galleries on Merseyside (UK).

MegaLink

MegaLink is a home and school computerised link provided by Network North for parents, teachers and students. It offers services such as e-mail, bulletin boards, information resources (including Minitel) and business applications. Access is via a compact portable terminal which plugs into the power and a telephone socket. Network North and Gwent Tertiary College are collaborating on this project.

Merseyside Education Superhighway Limited (MESH)

The initiative is to provide LINK Multimedia Learning Centres in schools and network the locations together. During schools hours the centres equipped with multimedia PCs will be used to support teachers providing the National Curriculum. After schools hours the centres will be used for commercial education and training. Began early 1995. Managed by LINK Training, Liverpool Association of Secondary Head teachers, Liverpool LEA and John Moores University.

MettNet

A project based in six schools and colleges in the north west and the midlands. The Wide Area Network project offers training resources and on-line access via leased lines and modems to Wirral Local Area Network. Project started in 1994. Managed by Wirral Metropolitan College.

Northamptonshire Distance In-service Training Project

The project involves six rural primary school teachers using innovative INSET and support structures based on networked information technology providing interactive access to distance learning materials and advice. The curriculum focus is science and access is via modems. Pilot began in September 1994 and ran until November 1995. Managed by Northamptonshire Inspection and Advisory Service and NCET managed the evaluation.

Open University Project

A national initiative that will mean that eventually all Open University students will have access to a computer with a CD ROM drive and modem to allow Internet access and teleworking. Began 1995. Managed by The Open University.

Open University PGCE Communications Scheme

Every Open University PGCE student has an Apple computer system including the First Class communications facility. Conference systems were set up during 1994 for all tutors and in 1995 these were extended to include over 1,100 student teachers on the distance learning based PGCE course. Managed by the Open University with NCET.

ORTnet

The World Ort Union is an international organisation providing resources to over 4,000 schools. The project has established an Internet server to produce multimedia material for evaluation/dissemination over the Internet. The schools use modems and the project began in Summer 1994. Managed by World Ort Union.

Project Connect

A scheme to introduce UK schools to the Internet and network them with local support colleges, using high grade Local Area Networks and ISDN. The pilot involves six schools in the Midlands and one in Hounslow and will encourage joint educational projects and access to educational resources. Connectivity to the Internet is via JANET. Pilot began in July 1994. Managed by Trusted Open Systems Connectivity Alliance (TOSCA).

SCET Contact

A six month pilot of 120 schools in Scotland using First Class, a graphical interface bulletin board with e-mail access. It is being used by primary, secondary and special needs schools and started in early 1995. Managed by SCET.

Schools OnLine

A pilot scheme which is funded by the Department for Trade and Industry and 16 electronics companies (including ICL, BT, IBM, Apricot, Intel, Bull, Acorn, US Robotics, Apple and Microsoft). It will connect about 60 secondary schools to the Internet. The scheme is concentrating on science and modern language projects. The project began in July 1995 and ran until Easter 1996. Managed by the DTI and FEI.

South Bristol Learning Network

The project aim is to support lifelong learning by creating opportunities to access the "Information Superhighway" for the benefit of the local community. Includes an initiative to install telephony and free Cable TV to 60 South Bristol Schools. Began in 1994. Managed by Avon TEC and South Bristol College.

Suffolk Schools Flexible Learning Project

This involves 12 primary and secondary schools and is exploring how schools might use access to resources on the Internet. They expect to use Internet via ISDN and the project began September 1995 and runs for a year. Managed by Suffolk LEA.

Web Servers in Scottish Schools and Colleges (WEBSAC)

The objective of the WEBSAC project is to explore the ways in which schools and colleges of further education might use and benefit from Web Server technology within their establishments. There are six pilot sites being supported by MEDC and SCET concerned primarily with the strategic and technical issues.

The Whitby Project

Three primary schools in North Yorkshire have been provided with Intel ProShare videoconferencing equipment and ISDN lines by BT and NCET. Using the system, pupils at the three schools speak to each other, peers in French schools in the Limousin and to a cluster of French teachers based at Whitby. Teachers use the system for discussing lesson plans, collaboratively producing worksheets and to save time and money on meetings and liaison. The project is supported by North Yorkshire LEA.

Examination of Witnesses

Ms Margaret Bell, Chief Executive, and Mr Jeff Morgan, Director, National Council for Educational Technology (NCET), called in and examined.

Chairman

245. Good morning, Ms Bell, Mr Morgan. Thank you very much for coming. Perhaps you would like to introduce yourselves and then make any preliminary statement that you would like to make.

(*Ms Bell*) Thank you, my Lord Chairman. I am Margaret Bell. I am Chief Executive of the National Council for Educational Technology, NCET as it is better known. NCET is a government-funded agency which focuses on the effective use of technology in teaching and learning. The main focus of our work at the moment is on the training of teachers and using technology to improve basic skills, which of course now includes IT.

(*Mr Morgan*) I am Jeff Morgan. I am one of the Directors at NCET. Currently my area of responsibility is for electronic communications technologies.

(*Ms Bell*) We have given you our written submission. From our areas of expertise there are two key questions which we feel focus on our expertise. What are the main barriers to the uptake of information superhighways as a necessary teaching tool and what steps should be taken to retrain the

Chairman *contd.*]

existing pool of teachers? We also have some significant comments on how the United Kingdom content (software industry) could be encouraged more.

246. Thank you very much. You have said that NCET is a government agency. Could you tell us just a little more about the relationship that you are in with respect to government departments?

(*Ms Bell*) Certainly. We are a non-departmental public body, a charity and a company limited by guarantee, so we have three personae. The main accounting department for us is the DfEE. We are also funded, however, from the other three UK departments for education. Our base grants funding each year is in the region of £5 million. In addition to that we take other earmark funded projects where we are given money to do specific pieces of work mostly from government but sometimes through private funding. Last year the total income was somewhere in the region of £12 million.

Baroness Hogg

247. You cite one of NCET's main purposes as evaluating the potential of new technologies to education. Could you tell us a little bit more about the framework you have developed for measuring the actual benefits of the Information Superhighway and compare these against traditional teaching methods and media and how you evaluate these benefits on a net basis, ie after allowing for the costs of training involved in their use?

(*Ms Bell*) Our work focuses mostly on learning outcomes. Obviously we are interested in the technology but we also look at what happens as a result of its use. I think I should point out, however, that there are several reasons for using technology in learning and only one of them is productivity gains, which is, I think, what you are implying, that in some way we can get more for the same or it will cost less to do the same as we did before. Certainly there are some fields in which that is the case. There are some areas in which you can indeed get productivity gains in the learning process, but that is not the only reason for using it. There is a whole new way of working that is engendered by the use of IT generally and, therefore, there is a new set of skills which learners of all ages need to adopt. In ensuring that they do acquire these skills it is not necessarily cheaper to do it. It would be akin to getting any other equipment into schools or colleges in order to develop skills. We do have to separate in our minds when we are looking at the evaluation whether we are looking at where new skills are being adopted, and indeed what the cost is of that, or whether we are in fact trying to look at IT in improving efficiency or effectiveness.

248. I was not thinking purely in terms of productivity gains. Even if one says it is a benefit to acquire new skills, which it clearly is, the cost of delivering those skills must be measured against the cost of delivering other kinds of skills through the education system. How do you approach this with any kind of rigour in evaluating the benefit of these new skills and, in particular, how do you separate the development of IT skills generally and the development of skills involved in the use of interactive Superhighways?

(*Ms Bell*) I will pass over to Jeff in a minute who will talk to you about some of the specific projects that we have got on at the moment. It is not easy to find a gap between IT skills and Information Superhighway skills. The issue is about information skills development, ie understanding how to find information, what to do with it when you have got it and how to re-present it generally. Those skills are also needed when you are looking at CD-ROMs which may not be on the Superhighway so there is not necessarily a clear distinction between those two skill paths. I think Jeff could at this point explain about some of the projects that we are looking at at the moment and the framework that we are using within those.

(*Mr Morgan*) Most of the work that we have done hitherto has not been in what you might call the area of Superhighways because the infrastructure has just not been in place. So most of what we know up to now about the use of communications technologies is via narrow band dial-up over the conventional telephone network. We have done quite a number of pilots over the past few years working with BT and Project Gemini, working with the BBC Networking Club looking at the effects of linking schools to the Internet through dial-up. The data and the benefits that we have got from those projects hitherto have been based largely on what teachers have told us, of changes that they have seen in pupils' work and in increased motivation, the greater availability of resources and the greater pride in terms of being able to present work taken from digital sources. We have got some information on that. What we are currently working on is a Superhighways project where we will be involved in managing the evaluation of 21 out of the 23 pilot broadband projects. We will be working with six teams of evaluators to develop a framework to analyse the benefits. The sort of things that we will be looking for will be to see what is the added value of connections to these networks and to see within what sorts of contexts standards are raised and learning is improved, to see what the benefits are, to see what the implications are for teacher training. We will be getting information on that as the project goes along. Our colleagues from the DfEE will tell you more about that. That is due to finish in March 1997. We have got a framework which we developed with evaluators which is designed to actually identify the added value because there is no point investing in new technologies unless you can find out what makes a difference.

(*Ms Bell*) Perhaps I may just add one thing about the evaluation of highways, super or otherwise, as opposed to other types of IT as it has provided a particular challenge for NCET. In other types of IT use it is relatively simple to set up first a small pilot and then a larger pilot and most of the data we gather from that is easy to extrapolate to a larger audience. When we are talking about networks we actually cannot evaluate how people will use networks until everyone is connected because the behaviour changes when all of the community is connected. When you have only a small number of the community connected people actually do not use the full facilities. So it has posed a particular challenge

Baroness Hogg *contd.*]

because we are having to use a leap of imagination to get to the extrapolation.

Lord Craig of Radley

249. Ms Bell, you have mentioned in your opening remarks an interest in productivity gains and the other purposes, which are the other three purposes in your written submission. There appears to be a presumption that IT will produce an added value. I believe that is still to be proved. There was one clear area in which it could produce added value and that is in productivity gain. I wondered what productivity gains you have identified which would help this?

(*Ms Bell*) The clearest one I can give you is actually not running on the highway at the moment but I can explain that as an example. Again in collaboration with the departments for education across the United Kingdom we have been looking at some software to improve basic skills. The age group we have been looking at is particularly the 7-14 year old age group. We have found some significant gains in mathematics using some of the software. That is, where the software is being used to manage the learning of individual students, and so each student is in effect presented with an individual plan which is rigorously administered against a framework of the mathematics curriculum and continually assessed and continually moved forward in the appropriate direction. It is fairly easy to see how technology could be applied to the management of learning as it has been applied to management in other professions and industries and I think that we have quite a long way to go in that scenario. Certainly in the future on the highway there is the possibility of these types of management systems being available for different types of learning, on demand, across the highway, they would actually manage people through a learning programme, Learning for Life or Children at School or whatever.

Chairman

250. Would you like to say anything at that point about teaching children with special needs?

(*Ms Bell*) NCET has always had a specialist division within our organisation looking at special needs and at the same time, in the same way as education is now organised, we embed it across the rest of our work too. The benefits that we have seen for everyone using IT have been magnified significantly by people with special needs, whether it is in terms of those with physical impairments being able to have access or whether it is in terms of people with learning difficulties being able to have their learning progressed at a different rate or presented in a different way. Particularly true now with multimedia where you have got sound and moving pictures which could supplement text where that is difficult, certainly in the first stages.

Lord Butterworth

251. In your document you refer to the importance of developing UK software in this area and you say that, unfortunately, there are few British companies able to take advantage of this opportunity and it is an area where the DTI might be able to help. I wonder if you could elaborate on this. What kind of help do you have in mind that would stimulate British companies to take more of a lead in the development of software?

(*Ms Bell*) First of all, I think it is generally accepted that all software developers now must have a global market in order to get a return on what is a considerable investment (in software developments). It seems our software companies have not successfully implanted those channels to the global market as maybe some of them are too small to do that successfully. As far as CD-ROM is concerned, for example, there is one notable British company that is very successful and that is Dorling Kindersley. They come from a book publishers background. We would struggle to find as successful a company now that comes from a software background. Therefore, we have to ask ourselves some questions why. What is clear is that these companies need to form very strong consortia of different types of skills. Dorling Kindersley has had to employ a large number of software developers and designers to supplement their publishers team. We have had some experience in the past of generating CD-ROM material for the secondary school curriculum, specifically Key Stage 3, and we think that model was very successful. If I could just outline how it worked there. Again, it was Department for Education money which we managed. Just enough money was put in to allow us to have a say on what products should be targeted, what the gaps were that needed to be targeted, something about the quality, so that we did not make mistakes that we already knew about, so that the quality was embedded, but the company themselves had to take some of the risk and they owned the products and marketed them afterwards. I think that is a very important model. I think, too, that you could add the need to set up channels to markets that they could then link into. I think one has to take great care in this area. What we do not want is too much money being put in so that the resulting price of these products does not allow a buoyant market which people are willing to invest in. So there has to be just enough 'buy in' to energise and have a say, if you like, in what should be done and the quality, but sharing out the risk. The other thing you could insist on is that appropriate consortia were built to make these products.

Lord Gregson

252. With software most of the money is upfront, therefore you have got to have a very long pocket indeed before you start on a venture of producing software. Bill Gates spent $5 billion on his latest piece of software before he even thought of marketing it. There are very few companies in this country who could face that sort of situation. Compared with the competition, the demand for software from industry and from commerce is very high indeed and the returns are much faster. How do you expect somebody in the United Kingdom to put the money up front that would be necessary and, also, to sit down and wait for the money to come back in very

Lord Gregson *contd.*]

slow sales to an incomplete education service, a tiny fraction of which is using this material? It is not possible, is it?

(*Ms Bell*) I was not envisaging another Bill Gates. I am not quite sure I could address that particular problem. I was looking at the applications software that would sit on top of that type of operation.

253. I was not suggesting software like that, I was thinking about the money that was spent on the whole package. If you sit down today and decide that you are going to produce a fairly extensive piece of software you are talking about many millions of pounds.

(*Ms Bell*) For a CD-ROM?

254. For the amount of software you are considering as being necessary to serve the market. You do not get much software for a couple of hundred thousand pounds, not at the rate they pay them these days.

(*Ms Bell*) There is certainly a requirement necessary for people to take that leap into the CD-ROM market which is a little bit more difficult than the market they may have previously been in. I think there is a relatively buoyant market, although one would have to look at whether the schools could afford to buy the software. I think that a good place to start would be in looking at CD-ROM that would address our curriculum needs. Again, because of some projects we have been doing for the Department recently we have done a number of surveys of CD-ROM that are available for the curriculum. We know that, for example, there is no appropriate software targeted on maths and science for Key Stage 2, which I think is a huge gap, and much of the software that is available in other curriculum areas and for the older age groups is from America, even though, one might add, some of it has been produced here, shipped out to America, packaged and re-sold back to us.

Baroness Hogg

255. To what extent is the development of networks necessary or even relevant to the development of applications software for individualised learning systems of the kind you have described? Why do you need a network for this or any Superhighway?

(*Ms Bell*) At the moment you probably do not from the point of view of using CD-ROM, but I think there are other reasons why you would want a network. I think one has to look forward to where things are going. This brings us on to a larger topic which I will touch on later. If we look at the primary schools in particular, one cannot expect a small primary school to become experts in IT, either in the purchasing of it or in the support and management of it. I think at some point in the future when the highway is mature it will be more like a utility, where at the end of the line the primary school turns on some kind of tap and out comes the software that they require and it is a managed service without all those problems about the technology. I suppose what I am saying is we would be getting the software we are used to now over some sort of highway where it would be much easier to out-source some of the issues to do with technology.

(*Mr Morgan*) One of the main advantages of networks in terms of software is their ability to distribute to more people. There are obviously more channels to a bigger market. The software you had produced might have been an original version of the CD-ROM, but once it is in the digital domain there really is no problem in making it run over a network of sufficient band width. You have then got access to hundreds of thousands of homes that could call upon it on some sort of software on demand basis or video on demand basis for payment because there has got to be a revenue stream for developers and for content producers. That is one of the main problems we have got in education. While there is a tradition of paying for resources in terms of books, there is not yet a tradition of paying for resources that come over the wires in the digital domain. Those schools that have connected to the Internet at the moment (and your Lordships might wish to know that we now estimate that there are getting on for 4,500 schools and colleges currently connected to the Internet) are getting information apparently "freely" over the Internet and so in order for there to be a revenue stream for content producers education establishments are going to have to pay. Unless there is that change of culture at some point the big commercial operators capable of producing high quality materials will not come into the market.

Lord Flowers

256. My Lord Chairman, could I be devil's advocate for a moment. CD-ROM is one thing; you have your own discs and you use them when you like, nobody interferes with you and that is fine, it fits into a rigid or constricted teaching timetable and so on. Downloading software from the Internet or any network in the middle of the night and making use of it during the day when you have got it (you will have it on the CD-ROM maybe in future if you want) is also fine, but the idea of running 20,000 schools or whatever it is in the afternoon on the Internet is absolutely ludicrous. This is the reason I cannot get on to the Internet in the afternoon, because so many schools are doing it, amongst other people.

(*Ms Bell*) You mean for congestion reasons?

257. Yes, and it is getting very great indeed. It is not conceivable that you can run an orderly school teaching programme using the Internet. It is already not possible, I am sure. Actually using the Internet live, so to speak, seems to me to be an entirely different thing. The other thing we are interested in when we have a Superhighway is whether the band width will be so great that this will overcome the problem. Then we could have all the schools we like in the world on it using it at the same time together with everyone else. I doubt whether that would work, frankly, but I would like to hear what you think about it because you are trying to promote this, after all.

(*Ms Bell*) Partly we are promoting it and partly we are trying to prepare schools for what probably is inevitable, in my view. From the point of view of the schools and colleges we should be concerning

Lord Flowers *contd.*]

ourselves with what band width we require for the work we do. I think the connection between band width and physical medium is something we leave to the suppliers. There is so much going on in that area that I think that is a complex issue. In terms of getting the physical infrastructure in place, I believe that will happen when the demand is there. Whether that will mean a change I think is up to the technologists who are looking at that. Our view is connected with what I was saying before about out-sourced managed services. There is one thing we cannot do in schools and that is to charge them on a timed basis for access to the Internet. First of all, it would be unpredictable which is more difficult than expensive as far as schools are concerned. Expensive is difficult but unpredictable is impossible because they cannot manage their budgets. Secondly, if you are charging for time it would have a very odd effect on the curriculum. You would get the infrastructure in and then discourage the youngsters from using it because it would be more expensive. What we need is a fixed rate charge so that the youngsters are encouraged to use it because they might say, "if we are paying for it anyway let us get as many people as we can on it." These are some of the discussions I have been having with OFTEL and I understand there is not a problem technically in terms of the regulations on that. Therefore, the schools should have an out-sourced service where they pay a fixed rate for a certain level of service. That would include a certain band width and it would also include a certain amount of support, possibly a certain amount of training. I believe that the competition in this area will be between people giving different competitive frameworks for that out-sourced managed service. The way to generate more people connected to the network is to ensure, if the government wishes to put money into this, that the first level of this service is very very cheap and possibly even free to the schools by some sort of subsidy. Hence what happens is we get universal access very quickly which starts people using it in an effective way. It also means that by the time the schools are ready to take the next step to the next level of service, whatever that might be, they are quite clear about why they need to, otherwise they would stay where they are. They would feel prepared to pay this extra money to move up a step so that they can get these services which they have not got at the moment. From the supplier's point of view they are getting an informed market. They know who is already on level one. They know those people are using it at a certain level and some of them will be straining at the leash to move up very quickly. Others will not. Others will stay there. It leaves the decision in the school's hands. Therefore, it will grow in terms of band width according to need.

258. Forgive me, we can all dream like that and do. I am asking whether it is a robust future that you are thinking of and, if so, what reason have you for thinking so?

(*Mr Morgan*) We are promoting the idea of schools being connected to networks, but we are standing back from it and trying to exercise a certain amount of critical judgment. I really do not think we are advocating the idea of running the nation's schools over either the Internet or even a broadband network in the future. We have to leave these decisions to schools themselves. That is the way our system works. If the schools wish to invest in connecting to networks then they need to be supported. The Internet is all we have at the moment. It is the best glimpse of future services that will be running over broadband networks and we have to learn from that. What we have learned from that is that there is certainly insufficient band width to download files of any size certainly during the lesson, but, there again, what teacher would ever suddenly bring in unprepared resources into a lesson. There has always been the need for advance preparation. I think we have also learned from the Internet that schools need local area networks in order to maximise the benefits, but, at any rate, even in our vision of the future we would never conceive that all schooling should be delivered over networks and we would certainly not conceive of a future whereby the school as an entity ceased to exist because we want our young people to grow up with each other, effectively socialised, and not sit staring at screens all the time.

Lord Hollick

259. You talked about the possible use of subsidies to pay for the usage of the infrastructure. Do you think there is a case for the provision of content? You have identified a number of serious gaps in the availability of content. Do you think that there is scope, for instance, for education authorities or for the Department to act as a commissioning agent to provide funding maybe on some sort of loan basis to fill these very substantial gaps?

(*Ms Bell*) Yes, I do, but I do worry about, first of all, sustainability and, secondly, market distortion. I think it is with great care that we should look, but I do think we should do something. As I said, there are examples from the past where we have successfully energised a particular software market in focusing on some area of the curriculum and I think we could learn from that and move forward with it. We do want to leave behind a healthy market that will sustain itself and it is a light hand that is needed.

Lord Haskel

260. We have had quite a lot of discussion about what you call accessing the tens of thousands of databases around the world which helps teachers decide what they are going to teach. Now we are beginning to discuss whether teachers need to spend their time concentrating on how to teach because of the problems of access and all the other things that we have been discussing. I wondered whether you had any views on this.

(*Ms Bell*) First of all, in terms of accessing what is available on the Internet, there are people now developing educational interfaces to the Internet which will make it easier to work within what they call "walled gardens" which have pre-defined some of the material that would be available and hopefully excluded some of the material that we would rather was not in there. There are also search engines, improving all the time, which will help you get access

Lord Haskel *contd.*]

to those things. The lesson from IT generally is that it does change in some aspect the role of the teacher and that can be the most difficult thing in terms of teacher training. Training about IT is relatively straightforward. It is the changing role that can be more challenging. Again, if I can go to CD-ROM, you will see the parallels with the Information Highway. If I could be simplistic about it, there are two aspects of a teacher's role: one is to provide the content, so 'I am the source of the history that you will learn'; and the other is to provide the pedagogy, this concerns how one learns about history and how one learns about historical thought processes and questioning or whatever. If you have a CD-ROM that contains the whole of the history curriculum then the content could come from another source and the teacher may not be the source of the information exclusively. Therefore, the role of the teacher can move towards the pedagogical issues such as how best to support people, what sort of questions to ask, how to mark the work, what is expected, what historical thought means and, therefore, encourage research skills probably at a much earlier stage than we would normally have expected it. When some teachers see their role as being primarily the information that they know then this can become very threatening. They need some support and encouragement to believe that their role is more important than that and that it does not matter if the information comes from different sources. Therefore, it does change the way they see themselves.

261. Do you not also think that some thinking ought to be done on the way that we incorporate IT into the general role of teaching? For instance, are CD-ROMs and databases going to replace books? How are teachers going to incorporate IT into the overall job that they do?

(*Ms Bell*) That is quite right, many of the issues are about management. At the moment if you are lucky you might have two or three computers that your youngsters have access to and maybe a shared access to the Internet. How do you manage that? Where do you put them physically? Do you group them together or spread them around? Obviously we have done quite a lot of work on that to give them some advice. There is a great deal of information there that they have to think about.

(*Mr Morgan*) I looked at your question that referred to tens of thousands of databases around the world to decide what to teach and I looked very carefully at what we had written and what we had written was that tens of thousands of databases around the world would provide useful resources for teachers. There was never an implication that teachers would have to consult the World-Wide Web before deciding what to do next. What we think is very very important for the role of the teacher in the future is the development of what we are calling "network literacy", which will be a skill that we believe all learners and all workers will need in the next century. Network literacy has two components. It has the traditional, old fashioned, perfectly respectable skills of analysis, synthesis, retrieval, searching for information, summarising and, also, the new skills of being able to log on to networks, to find the information using the sort of search tools that Margaret mentioned, download the information and hold it locally. This is an area in which we really need teachers to work in the future, not to be so much the sole imparter of information because they will not be, but to be able to work on the development of network literacy and information handling skills.

Chairman] I think this is when we should move on to teacher training.

Lord Gregson

262. Perhaps I can make a point on the overall situation. Ten years ago this Committee looked into education and training in new technologies and we spent some time in America looking at the work they were doing and I have got a horrible feeling we are just about at the same stage here as they were ten years ago. Do you feel in the future there has got to be a role for instructing teachers in this technology at the teacher training standard? How do you bring the rest of them up to speed? In America they had a marvellous scheme whereby they paid teachers to go on their holidays and take these courses and they were over-subscribed the two years we looked at this. Thousands of teachers wanted to take it simply because it used their holidays and gave them some money.

(*Ms Bell*) I think the first thing to say is that I entirely agree. I cannot imagine how we can still be undertaking initial teacher training without making IT a clear pillar of that training. We are trying to train teachers out there and yet we have still got new teachers coming through without the skills and I do not understand how we can do that. It should be relatively simple to catch teachers in their initial teacher training stage. That is one of the easier things to do if we had a mind to do it. An accreditation which goes alongside their teacher training certificate might be useful. It could show that they have got IT accreditation and qualified teaching status and that accreditation could be extended to those in continual professional development. I think that is key to a lot of these issues. I do agree that we should have some incentives. It seems an obvious thing to say, but one of the first ways of getting teachers into training is to give them IT for their own use first of all. You give them access to technology so that they learn to use it in the same way as I use it. I use it as a productivity tool, I use it as a word processor, I use spreadsheets because it makes my life easier. Why could teachers not use it in that way before we ask them to use it across the curriculum and with their students? In a recent studies tour to Australia we found that they took a different approach. Normally they introduce teachers to technology through either their own productivity measures or through administration in some sense, so that their first experience of it was usually helpful and away from the students; they did not feel threatened as it was in privacy. Therefore, the extension of the use of IT to across the curriculum was a relatively easy step from there because it was not seen as a threat or as an imposition. We could marry that to some work that NCET has done on portable computers several years ago where although the portable computers were focused on students, we

Lord Gregson *contd.*]

found out about the huge value they had for teachers. Again the teachers could take them home in privacy, they could learn about them and they could become familiar with the technology. We are currently undertaking an end of year scheme for the Department on portables for teachers. If we link that to your idea, Lord Gregson, of asking teachers to use their own time, whether it is evenings, weekends or holidays, and as a reward for using their own time they were given the portable computer on which they had been trained during the training session, I think this would kill a number of birds with the same stone. We could then link them onto a continual professional development programme which would include linking them from their new portable via a communication link to conference groups and other forms of information.

Lord Butterworth

263. On a number of occasions you have referred to the possibility of teachers being threatened. I wonder if I could quote one sentence from your very useful document: "In schools in the longer term we may see the overall decline in the number of teachers to pupils in favour of more adults with different skills." Do you see a reduction in the number of teachers in schools in the long term?

(*Ms Bell*) Possibly, yes. One of the trends that we have been seeing happen as a result of IT being put into schools is that schools who were traditionally wanting to use their staff budgets entirely for teachers are making some interesting decisions now. They would, for example, instead of having the deputy head trying to run the school network in his lunchtime, employ a network manager, possibly for less money than a teacher but someone who is focused on looking at the IT. They may also, because youngsters are getting access to IT in the library, employ another assistant in the library. In other words, they are starting to look at other adults in the school that could perform other functions that would relieve the teachers from those functions and allow them to do more teaching. There is one school which we have watched with great interest who, starting with a greenfield site, thought quite differently about how they might resource their school and they gave the teachers the choice of several models. The model they chose is that children are generally taught in cohorts of 80 with two teachers, one or two non-teaching assistants and a great deal of technology. The teachers like it, the children like it and it seems that they benefit from it too. A more flexible approach would be to look at the whole of the school resources and see how they may best be packaged because sometimes it may be far more appropriate to teach children individually or in groups of three or four, but at other times you can have much larger groups and to have that sort of flexibility is much more beneficial. Therefore, the pupil-teacher ratio becomes rather a hindrance in this discussion and I think it is a measure which we feel is not helping because it is not necessarily measuring the amount of attention that the youngsters are getting.

(*Mr Morgan*) There is nothing terribly revolutionary about using adults other than teachers. Further education, for instance, has been using that model for several years very effectively.

Chairman

At the beginning, Ms Bell, you mentioned the problem of what the barriers were to the take up of this new technology. Perhaps as we reach nearly the end of the session we should turn to that.

Lord Hollick

264. What steps do you think the Government could take to help remove some of these barriers? Perhaps you could also say what steps you think the private sector might also take and regulators might take?

(*Ms Bell*) I think one of the things that would help most is a very clear statement from Government that it is important. We recognise that IT should be an integral part of all learners' experience. I think there we would create a particular environment. NCET is a very small organisation and therefore we spend a lot of our time looking at the levers on the system, and we are not actually a very strong lever; therefore, we need to look at what makes schools and colleges change what they do. We need to look at the way they are funded, the way they are inspected, the way that their teachers are trained and positioned. Sometimes we hope that models of good practice and encouragement from the side also influence which is basically what we do. Therefore, if there was a strong DfEE statement that said, "This is our policy for IT in terms of education and training" and OFSTED and the curriculum bodies then said in response to that, "This is our statement and where IT fits," then everyone would see where it fitted and have confidence that it was truly an embedded part of our system. At the moment we have bodies like NCET promoting the use of IT when the inspection framework does not necessarily report on whether IT is embedded into the curriculum and where, as we have just seen, the teacher training framework does not ensure that new teachers are trained in IT and therefore we have the system moving against itself. So there has to be at least a cohesive approach from the government's sources saying that this is what they believe is important.

(*Mr Morgan*) We think that there are basically four bits of the jigsaw that ideally need to be set in place at the same time in order to remove the barriers and for things to go forward in terms of education. One is there has to be a clear curriculum imperative for the use of information and communications technologies in schools and colleges. It has got to be firmly there. We have made a good start but I think it needs to be developed. We have talked about the training of teachers in raising awareness. That is absolutely critical as well and it is a big challenge. There also has to be appropriate content and services and, finally, the infrastructure has to be there in terms of network infrastructure and equipment in the schools. The trick is to get those four bits of the jigsaw in place at the right time. It is a very difficult task. That is what we believe the challenge is.

Chairman

265. Thank you very much. I am afraid we have run out of time. That has been most helpful. If there are any points that occur to you which we have not elicited during the interview we would be grateful if you would write and tell us about them.

(*Ms Bell*) Certainly. Would you be interested in my leaving you some documents? I have a sheet on the Information Superhighways Project, a list of all the highways projects in the United Kingdom that we know about. Also, we have a Libraries of the Future Project that we are doing with the British Library which we have an information sheet on and a paper on the Productivity Project Report.[1]

Chairman] Thank you very much.

Supplementary memorandum by the National Council for Educational Technology

1. CONNECTING SCHOOLS AND COLLEGES TO THE INFORMATION SUPERHIGHWAY

The driving force for the Information Superhighway is unlikely to be education and training, it is more likely to be access to services and leisure pursuits which proves the "killer applications". However, when an infrastructure is in place it will provide a network for learning which could:

— Extend access

— Extend choice

— Increase flexibility (leading to Just-in-time learning).

In terms of a universal infrastructure for education there is a significant difference between getting schools/colleges on line, getting teachers on-line and getting students on line. Although students should be the ultimate aim it may be more practical and strategically more sound to aim for the institutions and teachers first.

Institutions/teachers on-line could be driven through administration—the DfEE, LEAs and funding councils could insist on key data being submitted and returned electronically. Schools/colleges would then only have to give raw data once, allowing reports to be produced as and when needed by those that need them. This approach has the advantage of getting the teachers to use the technology first and allowing them the opportunity to familiarise themselves with the technology away from the students.

The provision of effective communications access to students requires the access point to be a distributed network connection via a Local Area Network (LAN). Some colleges, many secondary schools and most primary schools currently do not have appropriate LANs capable of carrying the traffic involved in multiple Wide Area Network (WAN) accesses. Whilst most FE colleges have the makings of a college-wide distributed LAN, where networks exist in secondary schools they are usually confined to one room, and there are few networks of any size in primary schools. A key element of infrastructure to enable schools and colleges to take full advantage of the information society is the existence of a school/college wide network, from which can be hung as many devices as is affordable.

2. EASE OF USE AND ACCESSIBILITY OF INFORMATION

The competition is already building between service providers. This will increasingly lead to "easier to use" interfaces and more effective tools (eg search engines) which will allow more accurate targeting of the use of the Internet. Education should aim to be in step with but not ahead of the larger markets; standards should be robust and markets stable before widespread implementation is undertaken.

3. THE UK EDUCATIONAL SOFTWARE INDUSTRY

The UK should be well placed in the software market, we have:

— software know-how (much of the USA software originates from the UK);

— educational standing in the world (some USA producers "Anglicise" their products because they sell better world-wide);

— the English language;

— a considerable amount of content (much to be found with the book publishers).

What we do not have are companies with the right balance of IT and content skills, sufficiently capitalised and with effective channels to the global and home markets.

NCET is currently investigating the feasibility of developing and maintaining a directory of software (in electronic format) available to the education, training, home and global markets.

4. Teacher Training in IT

The Open University (OU) provides an excellent example of how to integrate IT into teacher training provision. All OU Post Graduate Certificate in Education (PGCE) students have a computer and are linked electronically to their tutors and to each other. They use the First Class conferencing system in order to conduct discussion forums. This course demonstrates that "the medium can be the message"; where technology is used to train the teachers it becomes a natural tool for them to use.

A powerful method of In Service development has been found to be encouraging a dialogue between teachers on the impact of IT. This can be facilitated through electronic communications if teachers have readily available access.

5. Supporting Additional Resources in Schools

More effective use can be made of the IT resources in schools; if schools are to be well equipped technologically then the resources must be opened up for community use. This could also provide a method of funding the additional resources needed. The Cumbria CREDITS programme (funded through the Single Regeneration Budget) is using primary schools as the nodes for community learning. This approach assists the schools in funding the resources they need and provides a very local, non-threatening environment for the community to develop new skills.

6. Information and Communication Technology's (ICT's) Role in Increasing Learning Productivity

[1]Studies have shown consistently that the use of technology in learning increases motivation. People who have previously failed and are not interested in further learning can be encouraged back to learning through ICTs. There have been a number of projects focused on tempting the disadvantaged and disenchanted back to learning and success eg The Bytes for Belfast project, the CHALCS project in Leeds.

The Integrated Learning Systems Project being developed and managed by NCET demonstrates that computer delivered structured learning can lead to significant increases in basic skills.

Evaluations of the use of WAN applications have shown that ICTs can increase productivity in education and training by:

- allowing more learners to have access to study through networks and telematics: people who were either unable or unwilling to participate previously can be brought in through distance education supported by telematics; this is particularly fruitful in F/HE.
- allowing schools and colleges to maximise their curriculum offering through spreading valuable and scarce teaching resources to a large number of dispersed learners. We have seen this particularly in Gwynedd North Wales where video-conferencing over ISDN has been used to teach GCSE Spanish to 35 students in five different schools. Group sizes in the separate schools would have been too small to be economical to staff up conventionally.

7. NCET's Role

NCET promotes the effective use of Information Technology in teaching and learning.

Previous work of NCET has included:

- evaluation of the use of CDROMs titles and systems and conducted several projects to ensure their effective introduction into schools
- evaluation of the use of portable computers in schools and identification of their benefits to both students and teachers
- development of material to support the use of IT across the curriculum

The current work of NCET is focused on:

(i) Teacher Development

NCET is working with the TTA to ensure IT is part of initial teacher training.

NCET-TV is broadcast every Wednesday at 4:00 am as part of BBC2's Learning Zone—the programmes feature teachers talking to other teachers about the use of IT.

NCET has networked a group of Special Educational Needs Co-ordinators who can share experience and expertise through electronic communications via the Internet.

NCET has built a development framework for Headteachers and Principals to provide guidance in their strategic planning for IT. Training is being built around this as part of the Headlamp Scheme.

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[1] Further information and/or references to evidence and projects referred to here can be obtained from NCET.

(ii) *The effective implementation and use of electronic communications in schools and colleges*

NCET is evaluating most of the Education Superhighway Initiatives on behalf of the DfEE, WOED and DENI.

In partnership with the British Library and the Department for Education Northern Ireland NCET is investigating the new Information skills required in a Libraries of the Future project.

NCET has information on the World Wide Web and is seeking new electronic ways to communicate with schools and colleges.

NCET is carefully monitoring the development of standards in desktop video-conferencing and gaining intelligence on benefits from projects.

Through regular dialogue with companies active in this area NCET has developed a picture of "who is doing what" and possible models for introducing more widespread use of electronic communications in schools and colleges.

(iii) *The use of IT to improve basic skills*

NCET has just completed phase 2 of the Integrated Learning Systems Project and is currently planning Phase 3. Work to date has shown a dramatic improvement in numeracy in those using one software package with a highly structured learner management system. The results for literacy were not uniform but significant improvements were shown in some cases.

(iv) *Encouraging appropriate software development to support teaching and learning in the UK*

Over the last 18 months NCET has managed the evaluation and documentation of around 500 CDROM titles in the context of their use in British primary schools. Information resulting from the evaluations has been fed back to the software developers. We are currently seeking ways of establishing a process whereby appropriate software is monitored and catalogued to provide a channel to market for developers and a source of information to purchasers; it would also provide a source of intelligence on the development of the market and advice on ensuring quality products.

Margaret Bell
Chief Executive

March 1996

Memorandum by the Department for Education and Employment

GENERAL

1. Both the former Department for Education and the former Employment Department have, from the earliest stages of the information technology revolution, taken steps to explore the educational and training potential of the ever-widening range of technological possibilities, principally through encouraging experimentation and application. The merged Department for Education and Employment continues to place a high emphasis on new technological development. The new Education and Training Technology Division at the DfEE has as one of its main objectives the development of greater synergy between education and training initiatives.

2. "Superhighways" open up the vision of a new generation of opportunities, though accompanied by many uncertainties both about the particular technologies that will be required to deliver these opportunities, and the infrastructure that will be available nationally and internationally.

3. Experience so far has been that information technology usage within education and training has developed gradually and incrementally. Assessing new potential, to the best extent evaluation opportunities allow, is still seen as the best approach in view of the potentially significant implications for capital investment in equipment and training, and for the organisation of teaching and learning at all levels.

4. In assessing new potential, it is necessary to balance:

(i) imaginative visions of the changes and benefits that may emerge;

(ii) the extent to which these are likely to support the delivery of high quality curriculum and training content, to be valued and supported by teachers, and to be realistically affordable in absolute and priority terms; and

(iii) the extent to which development needs to be stimulated by public policy, or can be left to the normal process of commercial development.

Different solutions have emerged, and will continue to emerge, for the various sectors in education and training.

Superhighways Initiatives

5. The UK Education Departments published last April a consultation paper, "Superhighways for Education". This posed specific questions for consideration. It was addressed both to education and commercial interests, including questions on the potential of superhighways in adult education and workplace training. Collaborative projects to assess the potential of fast speed transmission networks within education were invited, with the Departments offering the resources for formal independent evaluations.

6. In November 1995 the Deputy Prime Minister, Mr Michael Heseltine, launched the Education Departments' Superhighways Initiative with the publication of "Superhighways for Education: the Way Forward". This set out comprehensively the Government's views on the priorities for the development of education superhighways, and outlined action which needs to be taken by Government, industry and the education service if superhighways are to be used successfully in UK education. The paper was based on the earlier consultation exercise, and summarised the consultation. It also announced 23 innovative projects, with industry and other sponsorship, which will pilot the use of intermediate and broadband technologies across all sectors of education.

7. The piloting programme will run until Spring 1997. As well as curriculum-based projects, the initiative includes vocationally focused projects and projects for adult learners. The evaluation of these projects, funded by the Education Departments and managed by the National Council for Educational Technology and its counterpart in Scotland, will also focus on issues for children with special educational needs, teachers' professional development, educational administration, and issues to do with the protection of children from undesirable services and applications. Copies of both papers are attached as evidence to the Select Committee.

8. Since the inception of the initiative a year ago there have been a number of developments:

- *Schools*: in December 1995 the Office of Telecommunications (OFTEL) issued a consultative document on Universal Telecommunications Services. This discussed the issue of "School Tariffs", and included proposals to support superhighway connections for schools through the definition of a universal level of service to which all schools would be entitled. It proposed the creation of a fund, met by public telecommunications operators, to support school connections which might otherwise be uneconomic.
- *Further Education*: in January 1996 the Further Education Funding Council (FEFC) published for consultation a report by its Learning and Technology Committee which recommended a five year £84 million sector-wide initiative including access to a high speed communications network supported by a staff development programme, specialist advice centres, demonstration projects and a research programme.
- Higher Education: the expansion of SuperJANET—the Super Joint Academic Network—has continued, and now serves over 90 sites. This optical fibre network supports wide area networking within the UK research and higher education community, including distance learning and teaching, and the transfer of high definition images, video, sound and graphics. The four year £18 million development programme began in 1993 and is funded by the Higher Education Funding Councils. The development of metropolitan area networks will extend the connectivity of SuperJANET further over the next few years.

9. Within training the DfEE is assessing the potential of broadband telecommunications systems for interactive training, and developing an action programme to stimulate and catalyse their application. The initiative will build upon a series of recently-completed studies commissioned by the Department. It will explore the conditions that allow superhighway-mediated learning to make a practical contribution to the skills and competencies employers need, especially where training takes place on employers' premises.

Wider Government Action

10. The DfEE initiatives fit alongside a range of others within Government, particularly the DTI's Information Society Initiative. The DfEE and the DTI have launched complementary projects, with matched industry funding, to pilot the use of narrowband Internet services in schools. Discussion of the commercial opportunities in prospect for UK interests are being carried forward through an Education Sub-Group of the DTI's Multi-Media Industry Advisory Committee, the report of which was published last year. Export opportunities are being considered by the DTI's Overseas Projects Board advised by the British Educational Suppliers Association and others. The specific opportunities opening up within the teaching of English as a foreign language are currently being considered by an FCO-led group, seeking to capitalise on the fact that English will be the international language of the global communications industry.

Educational Administration

11. Superhighways also offer new opportunities within the management and administration of the education system itself. The increased ability of schools and other education bodies to communicate with each other and the centre (which would follow connection to superhighways) could be significant for

administration. The Department has used the Internet to make the Superhighways for Education and other documents available to a wide audience. Further material (such as the DfEE's various Charters, performance tables, and press notices) is also available through the Department's home pages.

12. Initially these are likely to be passive information services, but as advanced technologies become more readily available and acceptable, interactive services which guide the user in his or her search for the appropriate information will be possible.

13. Development in the administration of the education service, necessarily implying extensive interchange between the centre and organisations and institutions outside, also raises issues of wider Government strategy towards electronic communications. This is currently under consideration by a group led by the Cabinet Office.

International Developments

14. This activity within the UK is naturally reflected in wider international contacts and developments:—

(i) Following the Group of 7 Ministerial meeting in February 1995, two of the twelve consequential pilot projects being developed on a multilateral basis are relevant to the education world. The first (Global Inter-operability for Broadband Networks) will promote the establishment of international high-speed links among G7 and other industrialised countries, hence exploring the potential for inter-connectivity and the promotion of global standards. The UK's SuperJANET (Super Joint Academic Network) project, represented through the United Kingdom Education and Research Networking Association (UKERNA), will be closely involved.

(ii) A second project on "Cross-cultural Education and Training" aims to create national servers on the Internet to promote quality curriculum materials for the teaching of modern foreign languages. This will initially use narrowband connection but with the intention of upgrading to faster speed transmission as the opportunity allows. DfEE is fully involved in this project, and is funding the development of a server containing material on modern foreign languages and English as a second language. The project is managed by the National Council for Educational Technology and the Centre for Information on Language Teaching.

(iii) The Telematics Programme within the EC Fourth Framework Programme contains a discrete education and training sub-element. The UK is involved in 18 of the 23 projects identified so far for funding and a possible project to promote international connectivity across Europe. These include creating high quality networks for interactive use by tutors and peer learners in FE and HE institutions across several Member States. The DfEE, with the DTI, is represented on the appropriate Brussels Management Committee (CAN) for this part of the Programme.

Conclusion

15. The Committee will be fully aware that this is a fast moving area. Many of the developments described in this paper have materialised over the last year and, with the current rate of technological progress, it is hard to predict what the key issues will be in a year's time, let alone further off. But it is clear that the programmes of consultation on superhighways for education and training launched in 1995 and 1996 are bringing about considerable degree of consensus about the steps which need to be taken. It is also clear that 1997 will mark a watershed in terms of key evidence and development, from the conclusion of various initiatives including the first stage of the SuperJANET programme and the Education Superhighways pilot projects. It is however essential that the Department's strategy should remain flexible in order to take account of new developments which may arise.

Examination of Witnesses

Mr Robin Ritzema, Divisional Manager, Education and Training Technology, Mr David Short, Divisional Manager, Further Education Support Unit, Mr Andrew Partridge, Head of Superhighways and Multi-media Unit, and Miss Katherine Fleay, Head of Higher Education General Policy and Research Team (responsible for Information Superhighways in Higher Education), Department for Education and Employment, called in and examined.

Chairman

266. Mr Ritzema and colleagues, thank you very much for coming to see us. Would you like to introduce your colleagues and make any introductory statement that you have?

(*Mr Ritzema*) Thank you very much, my Lord Chairman. I very much welcome this opportunity to give evidence to the Sub-Committee. Perhaps I could introduce myself. I am the Head of the newly formed Education and Training Technology Division within the Department for Education and Employment and what that covers is issues relating to IT in schools, issues affecting Superhighways across education and training and, also, the use of IT in open and flexible learning where the two former departments have come together. On my left is Katherine Fleay from the Higher Education Funding Division of the Department. This liaises with UKERNA and the Joint Information Systems Committee about JANET and SuperJANET and issues on that. On my right is Mr David Short, who is the Head of the Department's Further Education Support Unit which has been involved with the recent report by Professor Higginson's Committee into networking needs in the further education sector. Beyond him is Mr Andrew Partridge, who heads the Superhighways and Multi-media Unit which is part of my division. My Lord Chairman, we have submitted a memorandum and I certainly shall not repeat its content. Perhaps I could just draw attention to the accompanying document entitled "Superhighways—The Way Forward", which I think the Sub-Committee has. This described a wide range of opinions expressed to us during a major consultation exercise last summer, and this covered a number of issues that are relevant to this enquiry. It also set out the Government's view on what should be the priorities shaping preparations in the education field for the Superhighway era. In that policy statement we emphasised the importance of: upgrading equipment; of encouraging more and better course ware (and that includes both software and materials); improving teacher confidence through a range of training measures; promoting robust technical and educational support; and ensuring a range of other issues, affordability, standards for inter-operability, and solutions to such issues as intellectual property rights. That is quite a formidable list and reflects what your Lordships have just been hearing. Since then progress has been quite rapid. Over the last three months we have announced a range of measures to help carry these areas forward. The pilot project programme, which you heard about this morning already, will examine a range of factors influencing Superhighway usage in education. We are assessing the quality of educational services currently being provided on-line to schools to gauge their educational value. We are examining the usefulness and viability of international networking of curriculum materials through the creation of a virtual languages server. As I think you have heard this morning, we are mounting a major pilot programme to equip over 1,000 teachers with modern multi-media portable computers which will enable them to improve their skills in private if they wish, and to explore the scope for curriculum usage. We do now have the report of Professor Higginson's Committee and its recommendations are being looked at by the Further Education Funding Council. The last point I would mention, my Lord Chairman, is that last Thursday, as the Sub-Committee are probably aware, the Prime Minister announced the creation of a new senior committee within government which is designed to take forward significant cross-departmental IT initiatives in the national interest. We expect this to look, among other things, at ways of developing new approaches to IT equipment funding in education and for the wider community, drawing on the Private Finance Initiative approach. I think this new phase of activity may well prove to be a trigger for innovative new partnership arrangements in helping schools and colleges prepare for the Superhighway. That is all I wish to say by way of introduction, my Lord Chairman. We are happy to assist with questions.

267. As I would have expected, Mr Ritzema, that is quite a lot. Could I begin by asking you what you see as the main things that you need to be doing to introduce the Information Highway as a necessary teaching tool in the United Kingdom? Could I add to that a reflection on the most recent budget settlement which seems to me to have possibly cut into the funds available for equipment and buildings in particular in a way which might actually slow down some of the initiatives that you are engaged in. Would you like to comment on those two things?

(*Mr Ritzema*) Well, my Lord Chairman, in the document that we published last November, which is not long ago in a fast moving situation, we identified a number of areas that had to be carried forward broadly in parallel and I outlined these briefly in my opening remarks. It concerned hardware and peripherals, curriculum software, training, support and solutions to such things as charging arrangements. There is a range of measures in hand to address these. From our standpoint perhaps the most important is the programme of pilot projects that we announced at the same time which are looking at a whole range of factors bearing on Superhighway usage and that includes affordability which, in a sense, brings me on to your second point. Of course everybody recognises that equipping and upgrading schools is an inherently expensive process. Any amount of money can be spent on equipping in the schools field. It is therefore quite important to be clear what it is you want to do, what exactly are the educational reasons for investing, what are the likelihoods those benefits will be realised if you do

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[1] Not printed.

Chairman *contd.*]

invest and then, as I said in my opening remarks, to look for new methods of approaching those equipping and funding needs. I think there is a general consensus that we are likely to see a great deal of debate about ways in which the public and private sector can work together in this field.

268. I had in mind in particular the initiative which the Further Education Funding Council was going to conduct on having a pilot experiment of further education colleges networked together to provide access to the public and others to networking. Would you like to say something about whether that is still going forward and if not, why not?

(*Mr Ritzema*) My Lord Chairman, I would like to ask Mr David Short to comment on that and Mr Partridge may also be able to comment. May I say that at least one of the projects in our Superhighways programme does involve linking and networking of further education colleges. Mr Partridge may be able to say a little more about that. Perhaps I can ask Mr Short if he has got anything to add from the FE standpoint?

(*Mr Short*) Certainly at the moment there is in existence a considerable number of local networks linking colleges in various regions and of course one of the main recommendations of the Higginson Report is that there should be a high speed communication network for the whole sector and the FEFC, the Council itself, is currently exploring the feasibility of putting this in place. It is expensive but ways, I am sure, will be found to explore positively the implications of this.

(*Mr Partridge*) If I might add, the London Colleges Multimedia Initiative, which is one of our 23 pilot projects, is a partnership which involves the London TECs and colleges right across London and will be looking at developing a broadband network linking open learning centres in those institutions. It is a significant initiative and we shall look forward to seeing the results in the spring of next year.

Lord Flowers

269. I wonder whether I can ask you a question about content. Assuming the Superhighway is a good thing, for present purposes anyway, we should be trying to encourage United Kingdom content for pedagogical reasons but also for commercial reasons. We are interested in what the barriers are against doing that. I also would like to add to that whether one of our most successful ventures in this country at the present time, which is the Technology Foresight Programme, could be used to encourage the development of United Kingdom content on the Superhighway? Should there be a content programme in the Technology Foresight Programme or should there be a separate content initiative? Is the Deputy Prime Minister's party going to be the generator of United Kingdom content? Is that the idea?

(*Mr Ritzema*) I will not comment, if I might decline, on what the new committee will do because it has just been set up. Coming particularly to the content side, though of course it is important if Superhighways are going to be useful for what comes across them to be relevant to educational needs, or education and training needs perhaps I should say. Our approach normally is to let the commercial market identify areas where benefit is to be had, and to exploit it themselves, and by and large that is probably the safest approach. As I think I heard a comment earlier this morning, it is possible to make very expensive failures if you try second-guessing the commercial market. There have been some instances of pump priming success; I think there have also been some instances of pump priming failure as well and the costs are escalating. I think I would prefer not to answer either yes or no to your question at this particular stage because we are in a state of considerable uncertainty about the development of Superhighways at the moment. We just have Internet E-mail, one or two services like that, most of which are not operating at even medium band speeds let alone high band speeds. We do not have very much to go on. I think it is premature at this stage to say whether the Government or other public agencies should or should not have a role in pump priming particular software investments. I think our policy has to be a flexible one. Obviously we do not exclude that possibility but the costs are rather against it and the previous track record is a little against it.

270. If I understand what you are saying, and I agree with part of it, you are saying that pedagogical policy can be left to the market. I would not be entirely happy with that.

(*Mr Ritzema*) I do not think that is quite what I said. What I think I was intending to say was that whether or not particular pieces of software were developed was at this stage for the commercial market.

271. I was talking about the content.

(*Mr Ritzema*) Pedagogy is not just software but how you use that software. We do think there are significant steps to be taken in how pedagogy develops and there are agencies, of which obviously the NCET is one, the Teacher Training Agency is another, that have a significant role to play in this area. Indeed, our projects, and I am sorry I shall have to refer frequently to our projects because they were devised explicitly to test out this kind of issue, will be looking at the kinds of new pedagogical approaches which may need to be developed.

272. Forgive me, I am not talking about that, I am talking about information content.

(*Mr Ritzema*) Forgive me?

273. What is the curriculum, so to speak?

(*Mr Ritzema*) Well, the curriculum we are talking about—

274. Let me be clear what I am saying. I am very much concerned that in this razzmatazz world we are talking about, the content of lessons given to school children will be determined primarily by commercial considerations, whether it is jazzed up enough to sell rather than whether it is sound teaching. I want to know what part the Department for Education and Employment is playing in trying to control or contribute to that debate?

(*Mr Ritzema*) Thank you. I think I see that issue a little more clearly now. I mentioned in my opening statement that one of the projects we had announced quite recently was to look at the quality of on-line

Lord Flowers *contd.*]

services available at the moment. Mr Partridge can say a little more about that. What in practice that means is that since there are three or four services to schools at the moment over the Internet which are not available at the high speed service but will increase in speed, we are looking to see what is the educational relevance and usefulness of the material being supplied in that way. That is where, I think, the Department and the NCET does have a role in assessing quality and assessing educational utility. That is a process I see us continuing to do. Now, in a sense I do not think I am saying we just look in a passive way at what the commercial sector produces because actually there is quite a close, almost symbiotic, relationship between the kind of evaluation work that we try to encourage and the way in which the industry responds. We are talking here, certainly in United Kingdom terms, about a number of companies with quite long experience of working in schools' IT and so far as anybody can have long experience, they have long experience. They are quite attuned to education needs and issues and there is constant interchange. They are striving in a sense to satisfy the educational needs of schools. They are fully aware that they are obliged to teach the National Curriculum and they are therefore looking for relevance to the National Curriculum in their school software. In a sense there is a process of information feedback. That in turn shapes the nature of the commercial products that come forward and there is an evaluation function in looking at those services and advising schools. I think I must place emphasis on the importance of ensuring that schools get good advice both centrally and locally, I think that is a very important aspect and one which again we are encouraging.

(*Mr Partridge*) My view is we are now in a position in relation to developing Superhighways where we were five years ago in the development of the CD-ROM. At that stage when we began to think about piloting CD-ROM in schools there was little curriculum content but in order to determine how CD-ROM might be used we made the best of what was available, piloted it and subsequently found that it was successful and it had a lot to offer. Following that, CD-ROM reached a plateau. It stabilised in the technology, and at that stage the Department stimulated the development of disks for the National Curriculum specifically. For the National Curriculum there were 12 disks developed which covered most curriculum subjects. These disks resulted in a four-fold growth of similar curriculum-relevant disks. I believe now that we are only at the early stage of piloting and that we shall probably be in 1997/98 before the Superhighway technology reaches the same plateau.

(*Mr Ritzema*) We are concentrating on schools but there is quite an important further education dimension as well.

(*Mr Short*) I think it would be fair to say that in many, many, if not most, FE colleges the role of information technology is crucial in the learning process in terms of getting achievement. I think it has got to be put in the context of securing achievement. People go to FE colleges in order to succeed, that is why they volunteer. They want progress, they want achievement. Everything information technology can offer is seen as a resource that will enable this achievement to be made. The FEFC Inspectorate, in its inspection, looks extremely closely at resources and the quality of the software, the quality of the IT that is available, and it will be judged in terms of the overall achievement of the students. I think that we must try and get away from the notion of IT for the sake of IT. IT is a resource in itself, along with other resources, which should have the ultimate aim of securing the individual achievement of the students who go to the college. I think this notion of what is suitable in terms of software is driven all the time by "Is it right for the student? Is it fit for the purpose that course itself has?" The colleges are very pragmatic about this. Some colleges indeed are designing their own software. It is quite common to find in a college now someone who is a software expert, who is able to adapt in terms of local needs what is suitable for that particular college. The software is coming from various quarters, the commercial quarter, the college's own initiative, but all the time it has got to be put in this context of securing success, securing achievement, for the students.

Lord Hollick

275. Can I bring you back to the specific point that the Technology Foresight Committee made about 1998 being the target date by which every school should be connected to the public broadband network. Everything you have been saying and the powerful bids you make for education both in schools and further education is fine but without an infrastructure it does not fly. 1998 is just two years away, that is completely unachievable. When do you think the infrastructure will be in place and what steps should the Government be taking and should you be agitating for to ensure that we get this very desirable position as soon as possible?

(*Mr Ritzema*) I think the Sub-Committee will be fully aware of the Government's overall policy towards the provision of Superhighway cabling and the competitive position it believes important there. Since the commercial sector is installing Superhighway cabling it determines the rate at which that is happening. Just in my own local area I heard that the franchise has just been awarded to be handled around the year 2000/2001.

Lord Gregson

276. Mine is 2005 by the way.

(*Mr Ritzema*) Things can change but it looks like a slightly longer timescale than 1998. I was not personally clear where that particular date came from and what underpinned it. The real question, I think reflecting what you have heard already this morning, is whatever the rate these things are coming towards us (and obviously it is rather hard to predict what will actually happen particularly after the expiry of franchises early in the next century), we shall have to see what happens then. What we have to do, I think, is be ready for a progressive migration in that direction and to try and ensure that the conditions into which we are moving, and they are very uncertain and changing conditions, that we are

Lord Gregson *contd.*]

as ready to deal with them as we can be. There are certain solid things that can be moved forward now. Training of teachers, attitudinal change, the development of approaches to lifelong learning are all aspects of that. There are other things that are more uncertain and will require, I think, change and action in the commercial market because one of the things that obviously we have not said this morning relates to where we expect to see the position of small software companies in the United Kingdom going. Obviously the position in the United Kingdom is there are many small software companies producing high quality products but it is a very volatile situation and we are seeing mergers, we are seeing international linkings together if I can put it like that. Only in the last month have we seen a collaborative link between Acorn and Apple, two companies who have had something like 60 per cent of the schools' IT market. We are in very fast changing circumstances and that makes it difficult to predict. As I say, I do not think it is the Government's view at the moment, and this is more for the Department of Trade & Industry than it is for us, that separate action is needed to speed up the installation of cabling, for example.

277. Do you think that licences should have attached to them a condition that all schools and further education establishments are cabled as a matter of priority?

(*Mr Ritzema*) I think I would prefer not to comment on what licences should or should not have because that is outside the scope of our Department.

278. It is reasonable for you to have a view on it.

(*Mr Ritzema*) What I think I would say is that I would welcome the commitment given by the cable companies that as they pass schools they will themselves connect them up, which I think is a useful direction. I believe BT has indicated something rather similar. I think we will see schools being cabled up. There are significant problems, which again perhaps one should just refer to, which are the problems of the rural areas, the mountainous areas, those areas where there are very wide school playgrounds and so on, these are all inhibiting factors to schools being very rapidly connected up. That is where we may see new generation technology coming in, such as radio based systems and so on, that will actually help with that process. There are already experiments I think going on in the commercial sector on this. That is the kind of rapid technological change that we have got to watch and we have got to be ready to adapt to. To take all our decisions now on the basis of what is current would almost certainly place us in difficulties.

Lord Butterworth

279. Have you any comment that you would like to make about OFTEL's solution to this problem?

(*Mr Ritzema*) The proposal that was put forward by OFTEL in a consultation which I think is still going on was an interesting one in that it posed the question whether a separate and in a sense lower tariff system was appropriate for schools.

280. Almost a separate tax system.

(*Mr Ritzema*) And if so how this should be funded. I think I would prefer to await the outcome of that consultation but it may be helpful to say that I attended a consultation day they organised about a fortnight ago where I think it would be fair to say that the audience, and of course it was an audience of those who wished to be present at that day, supported the case for some kind of special treatment for education users. That was not defined quite as precisely as OFTEL themselves defined it. There was quite a lot of uncertainty among the commercial interests involved, cable companies, BT, as to how this should be done. I think there was a willingness to look at this and to look at ways of bundling services in a competitive way, because obviously we are talking about an intensely competitive situation where the companies will want to put together groups of services, possibly put together consortia of interests, and make offers to schools who will be the ultimate purchasers of these services. There was, I think, some resistance to the idea of the levy which is understandable. I think I would prefer to wait and see what OFTEL do next.

Baroness Hogg

281. Could I take you back to your exchange with Lord Flowers on content because it would seem to me that the driving force in this must be the National Curriculum, that is to say the determination of what a teacher teaches will come through the National Curriculum and therefore the use of software will be at least in part determined by the use to which the teacher thinks it can be put in delivering the National Curriculum. There may well be a role for intermediaries in, as it were, selecting to act as, as it were, publishers doing that intermediate function between content providers and teachers there, but of course there may also be gaps in content provision. Could I just ask you whether you would see any role for the Private Finance Initiative in the development of content for learning systems for schools? Indeed, what application do you think the PFI might have in this area generally given its quite rapid development in relation to IT across Government services generally over the last six months or so?

(*Mr Ritzema*) Perhaps I could make two points. The first is, as you rightly say, the way teachers use this will partly be determined by the National Curriculum and partly by their own experience and preparation for using it. If I could just comment on a point that I think did come up this morning, it is now a requirement of all courses of initial teacher training that they do include elements of IT usage and experience. I can advise the Committee separately on that if they want. Coming to this question of the Private Finance Initiative, I did say in my opening remarks that the Government had just instituted a new senior committee led by the Deputy Prime Minister and I expect that committee to, in a sense, address this area among others, both broadly and probably in relation to education. Therefore, I do not want to go into a great deal of detail but I think it might just be helpful to say that obviously points that need to be addressed in considering the use of the PFI, and there are other approaches that

Baroness Hogg *contd.*]

are similar to the PFI, Challenge and so on, the intention is that the commercial sector bears some of the upfront risk for development and in return for that they get a return of some kind at some stage and those returns—there are various examples of this, I am not a master of all of those—can be measures in kind or they can be deferred payment streams and so on. Indeed there may even be a significant benefit to them of being in that collaborative partnership from the promotional viewpoint. These things are possible in education as they are in other fields but obviously the issues to be looked at are: What is the commercial risk involved? Where does the commercial payback come? How does this mesh with the autonomy of schools in determining the use of their budgets and of course issues in relation to the size of those budgets themselves? There are quite a number of interlinked issues which will need to be looked at in that context when the time comes.

282. Can I ask you a related question which is on the real use of networks in schools and in particular whether you think in the short to medium term at least local networks are, in fact, likely to be more productive for schools than Superhighways? To parody what could happen, I cannot see this massively wonderful use of curriculum time in primary schools encouraging eight year olds to surf along the Superhighway. On the other hand there may be a local network which is refining and delivering individualised learning along that defined curriculum to which you referred where the Superhighway is simply, as it were, delivering that mechanism, that may be better than a floppy or a CD-ROM, maybe not, but that is all it is in these circumstances. Can I ask you to respond to that parody?

(*Mr Ritzema*) I would just like to register the point as to what it is that Superhighways will deliver that are separate from what other forms of network and IT will deliver. Basically they will do some things faster and they will do some things more flexibly, particularly when it comes to image exchanges and interactivity of video and video quality material. The question then comes down to what is the value added for education of having those additional features? You can surf at the moment, although as Lord Flowers said you can only surf very slowly at times, so I think the real question is what is the value of networks? We have some experience already of the value of local area networks. I wonder if I could just ask Mr Partridge to say a word about a particular project we ran which was not so much in curriculum delivery but was in in-service training of teachers in Northamptonshire because I think that is quite an interesting example of where a network has actually been used for a particular purpose and has delivered certain results.

(*Mr Partridge*) We part funded a project in Northamptonshire linking a cluster of rural primary schools with electronic mail with a specific curriculum focus but mainly on in-service training, science at key stages 1 and 2. The interesting feature of this project was that once these six or so schools had the E-mail, they had instruction in how to use it for these particular purposes, they went beyond those purposes, they found the electronic mail was extremely useful for cluster development and exchanging information and expertise in other subject areas as well. I think that points the way forward certainly to slightly wider than internal networking but it also gives an inkling of what could happen on the Superhighway because that could be used for the same purposes, it could be used to join big clusters of rural schools and even clusters as far apart as Cornwall and Northumbria if they wanted to exchange experience.

(*Mr Ritzema*) If I could just add one point. The real question is what schools are actually going to do with the material. A point again that needs to be registered is just having a connection to a network is not much use if you have only got one and you cannot get at it very easily. What will be a requirement, I think, if schools are to make full use of very high band width services, and we are looking down the track, are internal school networks so the material can actually be networked around the school. Those require significant investment decisions that some schools are making now but others are some way off that. That is another dimension of the issue.

Lord Craig of Radley

283. Could we go back to this issue of cost to the customer or to the schools or the universities because, as you have been pointing out, the OFTEL initiative that we heard about earlier this morning and indeed from other witnesses, is that it is very difficult to get your arms round what all this is going to cost you as the customers, not only as a start-up cost but also as an ongoing cost year after year. I wonder what sorts of views your Department has on that, whether there is a policy guidance or direction to universities and schools as to how they should tackle this problem?

(*Mr Ritzema*) I would like to bring my colleague in in a moment on the university side of this. On the school side, I think it would be fair to say that one of the functions of the National Council for Education Technology, whom you saw this morning, is to give schools guidance on a wide range of IT related issues, which they do very energetically through a stream of publications and in other ways. So there is guidance available. To the extent that schools want different guidance, they are entitled to ask for it. That guidance contains, for example, one particular document that identifies the different stages a school can be at in terms of extensive IT usage and the various phases moving up to that. There is guidance available. There is also guidance available from a network of local advisers, some local authority, some independent, under the umbrella of the National Association of Advisers in Computer Education, so there is advice on that. In terms of looking down the track at global costs, you are quite right that depending on how far and how fast you go, the costs could be very substantial indeed. If we work from the pricing structures that are familiar to us at the moment, again this is another area of uncertainty to us, exactly what will happen to those pricing structures? I am not saying necessarily this is an analogy but if we look at the difference between

Lord Craig of Radley *contd.*]

mobile telephones today and mobile telephones a year ago we have seen some very significant changes. What I find difficult to predict is what kinds of changes we will see more broadly in the computer market and how the industry itself will want to structure charging regimes. I think it is quite important to recognise that at the moment we have very little experience of on-line charging for services and usage. I think it is not inconceivable that schools might be willing and able to pay for on-line usage. They pay for a certain amount of it now but, as you have heard already this morning, fixed costs are easier for schools to handle than open-ended costs. One of the areas that we are probing in the programme that I have referred to a number of times this morning, the Superhighways Initiative, is the way in which charging regimes can operate. There is one specific project, I think the Bristol project, which will be looking at this. I do not have answers but we have identified the questions and we are trying to get some information about them.

Chairman

284. You have mentioned the integration of training in IT within teacher training courses, what about teachers that are already in post? What is being done, or can be done, to overcome their barriers to the use of this technology?

(*Mr Ritzema*) There is a significant issue that needs to be addressed there. We conduct a statistical survey every couple of years and although that showed quite significant proportions of teachers did feel comfortable about the use of information technology, it also showed that quite a significant proportion did not. There was a significant hurdle to address there. We do now have the Teacher Training Agency whose remit is to look particularly at continuing professional development and they have recently undertaken an exercise to identify what should be the priorities in continuing professional development and information technology is one of the eight priorities that they have identified. As I understand it, and obviously they could supply you with more information more directly; they are establishing at the moment a framework for continuing professional development across all educational areas. They are acutely conscious of the needs and pressures in the IT field and they will be looking at questions of the ways in which you accredit this and integrate it into training. I think we have to recognise that while there is something that can be done, and needs to be done, at the initial stage, you cannot train people at the age of 20 for technology that is going to change rapidly every year or so for the next 30 or 40 years. There is a very significant load, I think, that has to be carried at the continuing stage. I would go so far as to say that I hope we may see some movement towards teachers themselves, in the context of lifetime learning, perhaps taking on more personal responsibility for updating themselves and more use of their own time. Because one of the objects of mounting the project we have referred to, to give multimedia portables to teachers, is that they can use them at home, they can use them, if they want to improve their skills, in holidays. That is a slightly different approach from the one that has normally been adopted towards professional upgrading which is it is always done in term time, with expensive replacement costs and so on. I am not saying it will supplant it, I am saying that IT is a field that lends itself to new approaches to updating. In order for that to come about there needs to be significant incentive. Teachers have got to feel it is important to do it, that it is valued when they do it, and maybe that there are professional incentives in terms of career advancement and so on. I think these are all issues the TTA will be addressing.

Lord Craig of Radley

285. Can I just continue on that for a moment. Is your long-term perception that every teacher is going to have a Government or an education authority provided laptop which in due time will have to be replaced? It seems to me it is quite a significant outlay. I just wonder whether that is your perception of the way we will go?

(*Mr Ritzema*) I think what I am saying is the advice we have had from the NCET, and from other areas, is that one of the things that helps give teachers confidence in the use of IT is the opportunity to practise in private, if I can put it like that, and our scheme is designed to address whether in fact that is the case and how far it is the case, how far it helps them use IT in the curriculum. As to where computers would then come from, what standard of computer you need, our scheme is providing modern ones which we think will be state of the art as we move towards the Superhighways era. There are simpler and more basic machines and they perform simpler and more basic functions. There is a whole variety of ways in which teachers may go about getting them and in a sense that is a question to address down the line. They are not out of sight in terms of cost although they are a significant investment. I do not think we are advocating one particular solution or another, we are saying here is a new way of tackling this, let us have a look at this and see how effective it is and then we will be in a position to advise and take further decisions. I think it is quite possible again that we may see PFI style action in this area too. I wonder, my Lord Chairman, if I can ask David Short just to add a comment on this front.

(*Mr Short*) I think in the further education sector in terms of staff development, the use of IT and competence in IT has been a very high priority and there is a very powerful reason for this. Many courses in further education have information technology built in as an essential skill. The GNVQ, for example, and the majority of GNVQ students are in further education colleges, has information technology as a core skill that should be woven throughout the entire course. This means, in effect, that every teacher must have some understanding and develop some competence in this if the courses are to be developed fully. I am sure you know the notion of extending core skills across a wider range is very much a matter of debate at the moment. I think the fact that it is not just a means of teaching, it is an essential part of that which has to be taught, is a powerful incentive in FE for teachers to develop these skills. That is why I say I think it is a very high priority in the FE sector in staff development.

Lord Butterworth

286. I wonder if I could bring you back again to schools in this area. Earlier this morning it was pointed out to us that one of the likely consequences of moving first to local and regional networks and then the changes that the Superhighway may produce will undoubtedly bring such changes in teacher training and I wonder what the long-term policy of the Department is? For instance, do we foresee a reduction in the total number of teachers? Do we see a rapid increase in the number of specialist nonteachers in schools? In the long-term what is the changing shape of the school going to be like?

(*Mr Ritzema*) I do not think the Department as such has a final settled vision of exactly what the ratio, for example, of teachers to pupils will be in 30/40/50 years' time because we do not really know, in fact we do not know at all, how the technology will develop. I think it is probably best to extrapolate in a sense from experience to date and where we are now which is that we have seen claims that the teaching force will disappear because of new technology frequently over the last decade but so far that has not happened. Quite a lot of the technologies around almost benefit from having more people working with them rather than fewer and that applies to some of the integrated learning systems we have heard about already today. At the moment there is very little evidence here, in fact I think I would go so far as to say no evidence here, and as far as we can judge, and we have not got comprehensive knowledge, not much evidence from other countries that in a sense teacher substitution for technology has taken place. It is quite hard to prove that. What I think we may see, and I would agree with the advice you have had this morning, is some changes in the teaching role of some teachers, not necessarily all teachers, to help their pupils gain network literacy, make use of the vast data resources that will be there. I think we have to recognise that pupils faced with vast data resources do not necessarily use them sensibly or know how to use them at all unless they are guided through. There will be a change in the role of teachers where they are teaching subjects that will make use of these extensive data resources. I think it is also correct to say that we will see new types of skill, some new types of school skill, being acquired. That is assuming that teaching continues to be defined as we are defining it now. But already we see IT co-ordinators developing in schools. As Mr Short has said, we see them developing in FE and I am sure the same is true in HE as well which involves a completely different set of issues. Whether or not the education cause will be furthered by people who have a quite different kind of training from orthodox teachers is as yet unproven, I think, because teachers are not just instructing or standing there supervising technology, they are doing a whole range of other things like inculcating values and morality and judgment, very important aspects of education, and they are going to continue to be important. I think in a sense your question brings to mind the question of what is it schools will be there to deliver in 30 or 40 years' time and that is a much broader and very difficult question that one can spend a lot of time on. I think we will see some changes. We cannot say precisely what they are at the moment. Certainly I do not think our expectation is of significant declines in the teacher force and indeed we are looking at a situation where pupil numbers are set to expand over the next decade and the way that interacts with the use of technology will be interesting to predict. I think it is fair to say, and perhaps this is a point worth making, that the new merged Department has published and has set out aims, a set of objectives, and they include consolidating on the opportunities new technologies can provide for teaching and learning. It is an active part of the Department's remit to look and see where benefits can be obtained.

Lord Craig of Radley

287. One of the issues this Sub-Committee is interested in is the barriers to development. I wonder can you say anything about what barriers there may be to the United Kingdom becoming a major content provider for the Information Superhighway and if there are such barriers what particular steps should be taken to try and overcome them?

(*Mr Ritzema*) Well, we have already talked quite a lot about some of the broader barriers. We have talked about equipment and training and about support.

288. I was concentrating on content.

(*Mr Ritzema*) Again, we have had some exchanges already this morning about software provision and so on. The United Kingdom is better placed than some European countries in terms of content development because it potentially has wider language markets than just the United Kingdom itself. On the other hand, and as I said in earlier evidence, a lot of the companies are small, they are aiming at niche markets, they do not have the marketing muscle of US companies based on the size of the US market. I think there are a number of questions that need to be addressed. As I said a little earlier, one is the extent to which there will be more co-working between British companies and either American or other countries. Another is the extent to which there will be more development at the European level. The Sub-Committee may be aware that the current Commissioner responsible for Science and Education, Madam Cresson, has set out an initiative in the multimedia software field to, in a sense, encourage more joint working in an attempt to aim at a broader European and ultimately world market. We will have to see where that goes. It is due for discussion at the next Education Council. There are a number of initiatives going on here. Once again it is quite difficult to chart the way in which this will go forward. I do not see any reason why United

Kingdom companies should not thrive, but whether there will be the continuing diversity of companies thriving in this way is a little more open to question.

Chairman

289. Could we turn just for a moment, and time is running on as always, to the HE end of the spectrum which many people would say has been very privileged in the development of IT over the years. I wonder how the development of SuperJANET is going in relation to the total higher education sector?

(*Miss Fleay*) SuperJANET is expanding fast. It now covers some 130 sites in higher education and research and is due to expand further. The Higher Education Funding Councils are devoting more resources to developing in particular the metropolitan area networks which are a way of expanding in a particular region linkage to the SuperJANET network through an individual site connected first to the backbone and then with other sites within that area. This seems likely to be a good way of increasing yet further the number of sites connected to SuperJANET over the next few years.

290. So the development of SuperJANET at least has not been adversely affected by the recent public expenditure settlement?

(*Miss Fleay*) I think that is right. SuperJANET depends for its funding on the Joint Information Systems Committee of the higher education funding bodies. The Committee's budget looks set to remain above £30 million in the coming year which should enable the continuation of SuperJANET services.

291. A lot of people, as I said to begin with, do think the higher education sector has been highly privileged in having this resource. I wonder to what extent it can be extended to other parts of national life, to industry for example? Is any consideration being given to that?

(*Miss Fleay*) I believe that the Joint Information Systems Committee do consider quite frequently who should be allowed to connect up to SuperJANET and their current policy is that there should be some clear connection with higher education and research. There are some firms that do have links because they have been able to demonstrate that they have research interests with higher education institutions and that therefore it is of value all round for those connections to exist. There are also a number of further education colleges that are being brought into SuperJANET because, of course, the further education colleges have become more involved in the provision of higher education: so that is perhaps a logical extension. Whether SuperJANET should be extended yet further to schools is perhaps a different sort of question because schools' needs may be rather different from the needs of, say, researchers in higher education who may be looking for international links with other researchers abroad or looking for ways into large information data sets. I think there is some concern among the higher education community that to extend SuperJANET too widely might mean that it would cease to meet the needs of higher education and research and also perhaps at the same time it would not actually meet the needs of schools or other interested users. Mr Ritzema may have more to say.

(*Mr Ritzema*) No.

Lord Flowers

292. If Lord Gregson were here he would explode at this point and say why can industry, because after all it is on the profits of industry that you run higher education and other fancy things, not have access as of right to SuperJANET? I am speaking for Lord Gregson, not myself.

(*Miss Fleay*) The funds that have been allocated to develop SuperJANET have been those that have been allocated for higher education. The £30 million or so is topsliced from higher education budgets. There is no particular reason why that money should be used to subsidise, say, links to industry if they do not particularly benefit the higher education community. Through research and so forth. If industry wants to connect up to, say, the Internet then there are commercial providers who can do so at cheaper rates. The purpose of SuperJANET is not really—

293. It is not SuperJANET. What you have said I understand and personally very largely agree with, but Lord Gregson would simply make the point that I have made, that industry provides the money with which you provide for all these things. Furthermore, if I may add a word from myself. What you have just said is really not in the spirit of the Technology Foresight Programme where one is trying to see what industry and universities and Government can jointly do to improve the economic and technological state of the nation. If one of the things they can do is to share the use of this very important facility with the money making sector, at the expense of course of industry, not taken from the higher education budget, industry's own money would have to go into it, in those circumstances why is it that industry cannot have access as of right to SuperJANET?

(*Miss Fleay*) Can I just add one point. SuperJANET is a development project at the moment, it is at the leading edge. One of the points that may be worth considering is that it has not yet reached the level of a service that can guarantee certain levels of performance all the time. If industry is dependent on having a certain level of performance provided then perhaps SuperJANET is not the right vehicle, and firms may need to look for something where they can be guaranteed a 100 per cent level of performance.

294. But industry would not have got very far if they had to rely on 100 per cent performance.

(*Mr Ritzema*) I wonder, my Lord Chairman, if I can just add one point to Miss Fleay's remarks. I think she has explained why in a sense, as we sit here today, industry does not have access to SuperJANET and of course the future in this field, as in others, is uncertain. We await advice on this sort of question from the Joint Information Systems Committee which is partly why it is there, to look at this sort of question. If it wants to change its advice then it can do so. I think it is quite important, since Lord Gregson is not here to make the point himself, to say that we have had some quite explosive remarks in the

Lord Flowers *contd.*]

other direction from companies in the field charged with supplying networking services commercially who are extremely reluctant to see SuperJANET broadened to wider usage outside the HE sphere. One can come to the conclusion they may be right or they may be wrong but it is nevertheless a fact that they do not welcome it. One of the views put to us in our consultation, and our consultation went not just across the education service but across the commercial sector, was opposition to this. I think what we are saying is that the rationale does not necessarily point inexorably, and for always, in one direction rather than another. It is not a straightforward matter and there are some fairly polarised views on this. We will have to wait and see how it develops.

295. You would help us greatly if you could tell us on what grounds there were objections from industry?

(*Mr Ritzema*) Because they are providing services that industry would potentially get at a subsidised rate, through access to SuperJANET. It is, as Miss Fleay said, at the front end of development and there is not a lot of that at the moment. In the Department and in Government generally we have to work a lot of the time at a difficult interface between the commercial sector and commercial competition on the one hand and helping services that we are here to support on the other and that does raise difficulties of this kind.

Lord Flowers] They wish to cut off their noses to spite their faces.

Lord Craig of Radley

296. What you are describing, it seems to me, is a Superhighway which is not universally available. It really brings out a very fundamental point, does it not, as to whether networks, even if they are still in the development stage, should not have introduced into them alternative users or customers if the band width is there to take that, or whether you are really in the business of saying we will provide some toll roads down which only this traffic or that traffic can go? What is the Superhighway? Is it going to be universally accessible providing people pay, and there is a need to pay, or is it going to be restricted in some sort of way to certain customers or customer groups?

(*Mr Ritzema*) What I said in my last answer was that we did in a sense try to describe where we are now and it is a little difficult to predict where in detail we will be going. I think we would entirely share your view that closed networks are not in a sense what the country is looking for. We are looking for inter-operability and interconnection and all these features. I think that is where we are heading. That is the way the commercial sector is going and the way commercial pressures are going. If we reach the stage where SuperJANET, and here I am speculating rather in advance of the kind of debate that JISC would normally carry out, sensibly forms part of a wider structure of networks I think we will be looking at the way in which it is funded and provided and the way in which in a sense its usage is charged for. I really hesitate to be drawn into more detail on that. Clearly we are at a peculiarly difficult stage where we do not know at the moment how the money flows will operate in this new field. That is one of the inhibitors on services, to pick up your earlier comment. Until we know how services will be charged for we cannot really tell what the demand for them will be. I think, to some extent, some of that applies to whether or not SuperJANET has wider application, as Miss Fleay has said: why it is provided in the first place with topsliced higher education funding, what is the weight of demand on it as a network from explicit HE research and wider uses, what capacity there is besides, and what funding basis if any should apply to the usage of that? As I said, there are polarised views and indeed I think the people who run SuperJANET themselves would like to see some wider applications. There are some quite difficult issues involved where we do rely for our advice in the first instance on JISC.

(*Miss Fleay*) Indeed and there are, of course, some restrictions on band width, particularly on international connections. At the moment the higher education sector feels that it is not really getting enough band width in its international connections for all the traffic, all the exchanges that it would like to make abroad. If you bring in other users then there is going to be even more demand for those services and the chances are that no-one is going to be satisfied.

Lord Craig of Radley] I recognise if it is still just a cart track in some areas then probably this is not the time to bring in further subscribers but it is really a perception of where you believe all this is going because it is very important for us to get a feel for it, that is as to whether networks by and large should become universally accessible or whether they should be toll-roaded as it were?

Chairman

297. Could I add to Lord Craig's question with a comment which I am afraid will have to bring us towards the end of the meeting. SuperJANET of course is not the only private network in the country, Lord Craig himself will be aware of other private networks. It always struck me as an interesting fact when I was some time ago now involved with your Department, as it then was, the thought that the Department network should be connected in some way to the university network full of expert hackers and insidious people of that sort was regarded with great horror and suspicion. That is also true of many people in industry. A subsidiary question to the one we are discussing is how secure do you think the firewalls are that would now make it possible to connect networks which are at present kept separate?

(*Miss Fleay*) I am afraid I am not expert enough to answer that particular question although I know UKERNA does place a lot of emphasis on its security function, particularly the tracking down of offenders. If I could add another comment, it is not simply a question of networks linking people up but what services are provided on those networks. At the moment the services in SuperJANET are essentially designed for higher education, and its need to access particular information services, and data sets. A lot of effort is being put into exploring the use of SuperJANET, for instance, to help academic libraries cope with the explosion of demand for their services and exploring how they can access information which they may not hold themselves or how they can provide sufficient copies for the extra students that they are now having to cater for, under the pressure of restraints on their budgets at present. There is also a question of whether, or how many, other people would actually find those information services of use to them or whether these services simply would not serve their needs.

(*Mr Ritzema*) If I may, I think Miss Fleay is quite right to focus on the service aspect of this. While the Superhighway analogy with the road network takes you a long way, it can lose you at points as well. The real question is what kinds of things does SuperJANET make possible for users and is that the only way in which they can get at them or are there other ways in which they can get at them and where is the commercial or supply interest there? I think the Sub-Committee will be aware that enormous amounts of investment are going into security of transactions of all kinds across the networks because that is the main impediment to commercial usage, the fact that security of identity, security of contract, methods of exchanging funding across international frontiers, these are very difficult questions which the Department of Trade and Industry spends quite a lot of time wrestling with on an international plane. We follow those but the area of interest for us in terms of security is over unsatisfactory material largely in the school context and there obviously we do have special interests.

298. I am afraid time has beaten us, as it always does. Thank you very much, Mr Ritzema and colleagues. Is there a final two sentence statement that you would like to make?

(*Mr Ritzema*) There is one final two sentence remark which is something we have not talked about today, but it is important. What will drive a great deal of the pressure towards Superhighways is the home market. Accessing the home market through the schools and through the way schools behave and through the way pupils get their experiences in schools will be an important determinant of how progress goes. I will leave it there, my Lord Chairman. Those are my two sentences.

Chairman] Thank you very much indeed. Of course if there are any further comments that after reflection you would like to make to us we would be very glad to hear them. Thank you very much.

Letter from the Department for Education and Employment

I referred, in my evidence to the Committee on 5 March, to provision for information technology in the initial and in-service training of teachers. This arose particularly in response to questions from Baroness Hogg (at 281) and Lord Phillips (at 284). I thought, in retrospect, that it might help the Committee for me to clarify the relevant teacher training provisions.

The Secretary of State's criteria for initial teacher training courses are set out in DFE Circulars 9/92 and 14/93, covering secondary phase and primary phase courses respectively. Each set of criteria includes a broad framework of the competences required of newly-qualified teachers. Newly-qualified secondary teachers should be able to "demonstrate ability to select and use appropriate resources, including Information Technology". Newly-qualified primary teachers should be able to "make constructive use of information technology and other resources for learning". I enclose copies of both Circulars (*not printed*).

As I mentioned, the Teacher Training Agency has identified "the use of IT to improve pupils' achievements" as a national priority for teachers' continuing professional development. They are developing national standards for teachers at four points in the profession: newly-qualified teacher, expert classroom teacher, expert subject leader and expert school leader. The standard for newly-qualified teachers will clarify the competences in the DFE circulars and all the standards will reflect the importance of information technology in schools.

The Agency has developed a wide-ranging information technology strategy covering all its work in this field, both on its own and in collaboration with other bodies. I know that the Agency would welcome the opportunity to give evidence to the Committee.

Robin Ritzema

28 March 1996

TUESDAY 19 MARCH 1996

Present:

Butterworth, L.	Hogg, B.
Craig of Radley, L.	Hollick, L.
Flowers, L.	Phillips of Ellesmere, L. (Chairman)
Gregson, L.	
Haskel, L.	

Examination of Witness

Ms Janice Hughes, Spectrum Strategy Consultants, called in and examined.

Chairman

299. Ms Hughes, thank you very much for coming. I wonder whether you would like to begin by describing your role to us and then make any introductory comments that you think will help us.

(*Ms Hughes*) Thank you, my Lord Chairman. I should like to say a few statements about benchmarks of the Internet and information superhighway and then I should like to go on and give some relative comparisons between countries. First of all I should like to state that there has been a fantastically high growth in the on-line and the Internet business; it has been so dramatic that we are definitely now in the process of a new revolutionary era. Some of the benchmarks on access and usage which are important for the United Kingdom are the following: PC penetration per household is 37 per cent in the United States, 25 per cent in the United Kingdom and only 7 per cent in Japan, but Japan is growing very rapidly at the moment as we speak. In Britain and Germany the PC has become the most frequently planned technological purchase outstripping satellite dishes, VCRs and cellular phones. Access is certainly key and what is really worth looking at is modemed PC penetration. Here the numbers are rather different. The modemed PCs in the United States are 20 per cent per household compared with only 2 per cent in the United Kingdom and only 1.4 per cent in Japan. Another indicator to look at is the number of Internet hosts per thousand population and the numbers here again with America in front are 16 in the US, 12 in Sweden, 5 in the United Kingdom and 1.3 in Japan. The UK is higher than Germany and France. You are probably aware that 70 per cent of all hosts are in America and represent the American language and the American content, but the United Kingdom does have the highest number of hosts in Europe. Cable as a network that can deliver access to households potentially offers huge bandwidth, huge capacity, a 140 megabit highway into the home and it certainly has plans to build a UK-wide Internet highway with a UK-wide agreement, perhaps similar to the London Interconnect arrangement, but it is not yet there and it will take some time to build out. BT clearly offers universal access and a universal network, for dial up to computer hosts and to on-line systems around the world, but when you look at fast connections, ISDN lines, the United Kingdom benchmark of BT is that we have expensive ISDN lines compared with Germany, France, America and many other countries. The UK has several, competitive UK and international companies all vying to create networks and many of the new entrants are seeking to build Internet backbones, providing Internet access, as a market entry vehicle for getting into the consumer and the business market so you have companies such as Energis, MCI, Sprint, AT&T and MFS all trying to build parallel networks as well as networks which interconnect with the core BT backbone in the United Kingdom.

In consumer markets the video on demand trials that have been set up throughout the world over the last three to four years are now reaching a stage where they are beginning to close down because they are not economically viable. Even BT would admit that it is simply too expensive to envisage offering video on demand or even near video on demand on ADSL fixed lines. At the same time fixed networks are under competition from wireless satellite networks with hundreds of inexpensive digital channels, channels which may only cost £100,000 per year to operate, once they are compressed yet, as we have seen with the big Tyson-Bruno fight on Saturday, potentially if they offer dozens of pay per view services—I think the fight generated £7 million—these digital channels are capable of generating sizeable entertainment, data and information income. We are seeing a revolution in the sky in America with DirecTV, and here in the United Kingdom if BSkyB launches digital, which is really a switching and data "superhighway" in the sky. There will be hundreds of channels which during daytime might be used by companies like Marks and Spencer or NatWest to run data networks and then in the evening they switch into providing entertainment and interactive services. The launch of digital terrestrial television in the United Kingdom really could result in mass interactive usage and new applications. We could have the equivalent of 6,000 pages of digital text delivered every 30 seconds, sent down with a set top box, capable of grabbing 30 to 50 pages that can be stored and retrieved whenever you want. In addition that same box could also provide access to the Internet.

Chairman] I wonder whether, having reached that point, we might move into a rather more question and answer mode.

Baroness Hogg

300. I have just one very brief question to make sure that I have understood your figures, coming to the set of figures on the Internet hosts. I thought you

Baroness Hogg *contd.*]

said, per thousand population, but you then went on to give percentages. Was that in effect 16 per thousand or was it 16 per cent?

A. It actually represents 16 per thousand.

301. So 1.6 per cent, and all your figures in that sequence would therefore have to be divided by a factor of ten?

A. Yes, I am sorry, that was a misquote.[1]

Baroness Hogg] It seemed a little high to me, I must say!

Lord Gregson

302. When you talked about PCs you did say on a telephone connection, and it was quite a low figure compared with the number of PCs. Does that mean that people are not using the PCs for Internet and therefore do not require telephone connections?

A. Yes, what it is, my Lord Chairman, is modemed PCs. It is actually very low. It is changing because the new shipments of PCs automatically have modems embedded in them.

303. If you are not using the modem then you are not on Internet, are you?

A. No, that is right.

304. It is a very low figure on Internet, 2 per cent of the PCs?

A. Yes, that is in households.

305. It does not look like a revolution to me.

A. It is the growth trends which are substantial, and the point about the modemed PCs is that in terms of the new shipments taking the example of Japan perhaps, which has a very low number given its industrial development status, this year there have been seven million PCs shipped to Japan and they are all modemed. Some of those are destined for households; many of them are destined for businesses, but that will transform this year the number of potential Internet access in terms of the modem connections.

306. Assuming that the modem activity will be taken up? There is no indication of that; in fact, the indication is the opposite way, is it not, it is a very slow haul?

A. Well, no, the actual growth of connections to services such as NiftyServe in Japan is a phenomenal growth rate: the growth rates are 200 per cent, so they are more than doubling all the time, and when you do the projections, it does show that it will be sizeable numbers in five years' time.

Lord Gregson] That is what they said about cable, of course, is it not?

Lord Craig of Radley

307. Should you perhaps also be factorising those modem percentages in relation to the cost of access? In America there is free access, local telephone calls?

A. Indeed.

308. It seems to me that that can have a big biasing effect on your figures?

A. Yes.

309. So they are a bit raw still?

A. No, they were just illustrative of the access that one has today to the Internet, but then when you look at country comparisons, you are absolutely right: countries with free local access and competitive communications networks tend to have higher uptake rates in terms of those modems that are then used to connect on to on-line and Internet services.

310. Nevertheless you do describe these as benchmarks as though they were quite specific as guides?

A. Yes, they are benchmarks of those particular items, that is, PCs and PCs with modems, but if you then go into actual numbers of connections there are many more benchmarks.

311. So do not draw too close a comparison country by country on those percentages?

A. No—I had some other things to say, but did not.

Chairman

312. Nevertheless the uptake of PC modem Internet connections in the United States is clearly far in advance of the United Kingdom. Can you say something about your view of how the Americans have overcome the barriers to Internet connection which we have not yet quite managed to overcome?

A. Yes, my Lord Chairman. The Clinton candidacy was actually built very much on the NII, the national infrastructure initiative, and from that moment in time there was a very powerful awareness campaign which continues today, and there has recently been a new launch called Net Day 96 in which Al Gore and Mr Clinton are defining the four pillars of the information superhighway for schools, libraries, hospitals, and insisting that these four pillars must be achieved in terms of modern modemed computers, full Internet access, teachers trained in IT and the development of the content. The American Government are very keen to foster joint governmental and private investment initiatives with these campaigns, and what they are currently launching is an incentive scheme for organisations to come in and sponsor these four pillars in schools and public places, so that a campaign of awareness has been one important issue that has been followed through over the last two to three years. The United States has also been very successful in creating centres of excellence. They give examples of New York for literary content and development of the Internet creating talent and a technical skill base. They point to Los Angeles as being a centre for video content and high speed intra-net connections between, for example, the Hollywood studios and all the ancillary services as well as throughout the defence industry on the west coast of America. The United States also has a very important debate under way on the further liberalisation of the communications infrastructure pushing forward there. It was interesting during our interviews in the United States and Canada that they do actually look to the United Kingdom as a role model for our telecommunications liberalisation and the strength

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[1] The figures have subsequently been corrected.

Chairman *contd.*]

with which Oftel has pushed forward competition in the United Kingdom.

Lord Flowers

313. The Americans obviously are very go-ahead, led by the US Government. What initiatives would you hope for from the British Government to try to keep up and while we are on such comparisons, what sort of initiatives have the Japanese Government taken?

A. Perhaps I may start with Japan, my Lord Chairman, because I think that there might be some points from that which tie into the United Kingdom. Japan has a rather different model from the United States and the UK. It has a highly controlled and centrally planned vision for the information superhighway, and there is an enormous amount of text and documentation on pursuing the G7 initiatives, and one of these initiatives within Japan is to create a Telecommunications Council which represents co-ordination between all the different government ministries. But unfortunately in practice the two key ministries, MITI and MPT, are completely at loggerheads and a lot of organisations in Japan have to have two different regulatory advisers in their companies, whether it is IBM or Fujitsu, because they have to send different people to the separate ministries. They also are coming at the problem of the information superhighway in rather different ways. MITI itself is developing a programme for advanced information orientation. It is trying to promote content initiatives, and I think that there is some recognition in Japan that they understand that while they may be ahead in technological manufacturing research, they are quite a long way behind in terms of software applications and the content side of the business. In contrast MPT is trying to promote and even has commercial shares in the broadband networks and in the video on demand trials, which is a very different approach from regulatory bodies in other countries. The MPT are still committed to a vision of broadband cable covering 20 per cent of the country by 2000 and 100 per cent by 2010. These two policies are not really working in co-ordination or in parallel. Therefore, while Japan is spending huge sums of money on multimedia and telecommunications research and development, it will be difficult to point to lessons in Japan that the Government might adopt here in the United Kingdom and actually, on the contrary, Japan is very much in the mode of trying to learn from the lessons of both the United States and the United Kingdom. In terms of turning to the question on initiatives in the United Kingdom, it is our view from the analysis that we have undertaken that it is very important to promote awareness and to build a vision with practical responses and policies from the Government. The Government itself needs to be a leader in IT, and this is very important in education. Australia and Singapore are two countries which have very high PC modem, and high PC Internet uptake and usage. It is very important to have a liberalised communications infrastructure and to aim at "inter-operability" between all systems. Within the telecoms field we are probably leading in this arena. However, in the area of television, we still have some way to go and we currently have a system whereby we have a gatekeeper operation where one entity, BSkyB, is regulating the content and filtering out and selecting which channels can be seen by the viewers. This is intended to be changed in the new digital era although one would argue for symmetry between analogue and digital in terms of regulation of video and data signals as they are going to emerge in the future in the broadband field. We also consider that another lesson is that the framework should be "technology neutral;" the Government should not try to pick specific technologies but create the framework and allow the market place to dictate, to determine, which technology wins. This is the opposite of Japan where they still try to pick technology winners. I have one last point, my Lord Chairman: a lesson from the United States is the venture capital market which seems to be a very powerful force in providing funding for the smaller innovative entrepreneurial companies that underpin the growth drivers in the new information superhighway industry. In contrast, in the United Kingdom, there is greater conservatism and less risk taking when it comes to investing in the new technologies and the information applications.

314. May I just ask a supplementary, my Lord Chairman. That was a very interesting and a very full answer, but it dealt only with the system and not at all with the content. If you are talking about bringing superhighway into the schools, schools will not use it unless there is material coming over the wires or cables or whatever that is of use to them. Would you like to say a few words about the development of content?

A. Yes, my Lord Chairman, the development of the content is incredibly important, and forgive me for not mentioning it. It is an area which, as I have already pointed out, is very much dominated by US content. Schools are very short of time and they need to have filtered information, information that has been editorialised and information that has been made with respect to the Key Stages for the curriculum structure. They therefore will need to draw on content which has been made specifically for use in schools. One difficult question is who will pay for the content. One might look to organisations such as the BBC and some of the existing publishers, but at this stage of the Internet development most of the revenue that is being generated is still in the network infrastructure and there is very little revenue being returned to the content providers. At the moment we are in a vicious circle of disinvestment in content. The Government may need to allocate some seed money and financing, to stimulate the development and investment in content either through some existing budget allocations or additional allocations.

Lord Gregson

315. In your talk about America you mentioned that they were developing wireless as well as broadband cable. Our information is at this point of time that there is little priority going into developing cable in the States and in fact it has almost come to

Lord Gregson *contd.*]

somewhat of a halt. Does that mean that they are putting a lot more emphasis on delivery by radio than they are on delivery by broadband cable?

A. The relative success of the ventures such as DirecTV and PrimeStar, who have captured over one million customers in 18 months, has taken the cable industry by surprise with their digital success, their better quality pictures and their pay per view capabilities.

316. Whose digital success, cable or wireless?

A. The wireless digital success, their ability within an instant to deliver over 100 channels which offer near video-on-demand viewing. This has been a shock to the cable industry and many of those cable industry players, including TCI and Time Warner, are now looking at investing in satellite ventures which will compete with their own cable networks.

317. Considering the wide application of terrestrial direct link radio in the States via mobile phones and so on, why only satellite, because you can replace a cable so easily by just putting on an aerial? The aerials exist, that is the point.

A. The advantage of an investment in satellite is its universality from one central point, the coverage that it achieves from that single satellite investment, and if the United States were to convert the terrestrial transmitters to digital as we are planning to do in this country it would actually take several years still to make that conversion across thousands and thousands of transmitters.

318. I am not talking about the television transmitters; I am talking about the thousands and thousands of radio transmitters that are now built in this country and that are now built in America—why not use them? They work on microwaves, do they not?

A. The use of radio transmitters is the MMDS concept, is that what you are referring to?

319. Yes, better than satellite.

A. There is one very big project, TeleTV, with Bell Atlantic, Pacific Telesis, and NYNEX who are looking at doing just that, but it is very regionalised, and again they do not have nation-wide licences, to roll out across the entire country. However, you are obviously right, they do have the capacity to offer digital terrestrial services, and they are indeed planning to do that across their region, but it is not as attractive in economic terms as the satellite systems that are being developed and expanded at the moment.

Baroness Hogg

320. If I may just follow that one through, my Lord Chairman, that is because—?

A. Because of the advantages of the economies of scale in the acquisition of the rights, buying all of the content rights for the entire territory, the economies of scale in the operation—it is one operation—and the economies of scale to some extent in the delivery of the boxes and the marketing for that single entity rather than having regionalised entities.

Lord Haskel

321. My Lord Chairman, we have already had a discussion about America and I wondered whether I could just refer to something that Ms Hughes said in her opening statement. You said that digital television can deliver 3,000 pages into a box and store them?

A. It cannot store all of them at the moment.

322. I did just want to clarify that. It did seem extraordinary! Can you enlarge on it?

A. Yes, indeed, my Lord Chairman. In the new digital broadcast environment where the Government is proposing to offer 18 megabits of capacity to deliver five digital channels, one could envisage 2 megabits of that 18 megabits being dedicated to a super teletext type service or data service. Now within that 2 megabits an operator could transmit at a stream rate of the equivalent of 6,000 pages per 30 seconds that changed every 30 seconds. If you included photographs within those pages you would only perhaps get 100 pages per 30 seconds. The box technology that is being proposed at a reasonable cost might only allow you to store an estimated 40 pages of those 6,000 pages. It could be more, but it adds £30 or £40 to the box price as you add another megabyte of storage.

Lord Craig of Radley

323. My Lord Chairman, may we perhaps go back to the subject that Ms Hughes has touched on already, that the Government needs to be a leader in IT. You explained to us some of the Japanese problems of separate ministry approaches. In this country the Department of Trade and Industry, the Department for Education and Employment, the Department of National Heritage, the Department of Health and Social Security, and OST all have an interest and a handle on this. What is your perception of that approach? Do you think that the United Kingdom Government has a satisfactory approach to the superhighway, the content and the expansion of IT?

A. The UK has some very good policies for facilitating telecommunications. In the area of incentivising investment I think that we could perhaps do more. We are a medium sized country. Unlike Singapore, Australia or Sweden it is much more difficult to plan and implement an "intelligent island" concept. The Government however could do more in terms of setting targets with a consistent vision that recognises the gap that we have in the content area. We tend to be quite well supplied on the infrastructure and the networks, but we have less appropriate content to put on those networks and therefore we draw on more content from America than from UK-based sources. Therefore, government initiatives across different areas of health, education, industrial development, might want to focus some of their efforts in the years ahead on the content rather than just the networks.

324. And when you talk about targets, would you suggest what sort of targets you have in mind for Government to set?

Lord Craig of Radley *contd.*]

A. Setting targets of required standards of content that we would expect the schools or the hospitals to achieve in an ideal society, and then be realistic about the cost of what that would imply and how much of the cost might come from the private sector and whether there is any way of providing seed capital, seed funding, soft loans, to stimulate those investments.

Baroness Hogg

325. But is it the schools and hospitals that would have to meet standards? Are you envisaging that they would be the providers themselves? Surely the standards are to be set on providers, are they not?

A. No, I was thinking in terms of the providers being assessed in terms of whether they were matching the targets that might be required by the schools. If the schools do not have sufficient income in the budgets allocated to this area, could the schools be the advisory council for what is required in educational terms and what is most useful?

Lord Hollick

326. My Lord Chairman, I wonder whether we can just explore a little bit further the role that the United Kingdom plays in the provision of content. In your earlier remarks you said that President Clinton had made this a key element in his election campaign, and I think that they are high on exhortation.

A. Yes.

327. And having a day set aside to promote awareness of the superhighway obviously is part of that programme. What concrete steps though have they taken to promote content? Have they, for instance, said to American schools that they must invest in this? Have funds been provided to do that so that there is, as it were, a demand that is created? Have they made funds available—I think that you talked about joint funding?

A. Yes.

328. Has the US Government promoted content in joint ventures with the private sector and have the steps it has taken with government information been helpful? What are the concrete steps that have been taken apart from the very successful exhortations to stimulate the content?

A. I think that most of the effort has been on exhortation and the promotion campaign. The actual funds allocated to content have been very small indeed. The one example that we have of a recent initiative is to encourage private sponsorship in schools. It is for 5,000 schools on the west coast of America. The amounts of money that the American Government is putting in are really quite small, seven to nine million dollars; it is not a large amount. They are seeking private matching funding for those initiatives, and those are all about providing Internet access, connectivity and content for those schools, so there are some examples of small initiatives. There is however, no intention in the US Government to invest directly in content. It is intending to leave that to the private sector, but there is one other initiative where they are using the FCC and a new regulatory structure below the FCC called the Open Video System, and you may already have discussed this, but this system is regulating the telcos'—the phone companies'—carrying content, and they are also planning to do deals with the cable companies against the price controls of cable. There are one or two agreements which are specifically under negotiation at this moment, whereby the cable company is agreeing to provide "free" internet access to schools, public places, libraries and hospitals, in exchange for softer, more flexible treatment from the FCC on the pricing rate structure for cable.

Lord Gregson

329. It is well known in America that the Department of Defense supports a lot of educational spending and science and technology and they have created very extensive databases. The Boeing database is entirely paid for by the Department of Defense—probably the most extensive one in the world—and that is all available to the educational establishment for free. That must be an enormous support, must it not?

A. Yes, no doubt it is, my Lord Chairman. Certainly the originator of the Internet itself, DARPA, the defence organisation, was very much the original government-funded infrastructure which enabled the universities to participate, to look up those databases, but that support has been considerably reduced and is being cut back in terms of infrastructure support.

330. But the support for the database is 90 per cent of the cost, so it must be an enormous help?

A. The databases themselves which remain open are not encrypted for confidentiality reasons and, of course, are part of that enormous advantage that the United States has in terms of content.

Lord Hollick

331. That is a particular stand that the United States is taking. Maybe it is just to do with constitutional requirements and freedom of information which the United Kingdom Government or, indeed, any other government, could take to provide a wealth of information on the superhighway, so that is a measure, almost a cost-free measure, that the Government could take actually to stimulate the content and provision of content?

A. Yes, my Lord Chairman.

Chairman

332. Ms Hughes, you suggested a number of other questions in a paper that was sent to us, including what I thought was a rather curiously worded question number two. You have discussed that to some extent, but would you like to elaborate on it?

A. My Lord Chairman, I do apologise for that.

Lord Gregson] We thought that it was a marvellous description for "wireless"!

Lord Flowers

333. Or a wall socket!

A. It is actually an idea that BT has for the new information society. When British Telecom tries to change applications which provide customers with really enhanced services, they have a layering which starts off with the wires and switches at the bottom, the software interfaces, the software applications, and then the customer management and billing and, if you like, the customers on top. When BT tries to make customer friendly changes it has to invest all the way down through that layering of its own infrastructure, right down to the switch level and then at every switch throughout the United Kingdom. To create the sort of software applications that we now have on a mobile phone requires an enormous investment by BT which involves rebuilding their entire applications network. This reflects their own vision, that they have to move the applications up to a higher level so that they have switch neutrality, switches that are capable of being the recipients of applications changes which are quick to introduce and cost effective, it is a very complex concept. It is one that we have only just explored with BT and I think that it is something that is very much a world first that they are developing, and it really does mean a restructuring of the concept of telecommunications.

Lord Hollick

334. May I just follow that up, my Lord Chairman. Having made this investment what would it enable BT to do and what is going to encourage them to make what sounds to me a very significant investment at each location?

A. With regard to what it will enable them to do, I will use the example of Nokia phones because they are quite a good illustration. Nokia phones originally had £20 million spent on the software applications which enables you to store your 50 most commonly dialled numbers and to retrieve data. You could even have stored weather alerts, financial information, which is broadcast to your handset. I use that as an example just simply to show that BT would like to be able to deliver to the home new applications down the wire rather like computer applications that might then be embedded in your handset. New applications might turn on the TV and tape recorder, store personalised TV items or update a family share price index. It does require a major investment in the structure of the switches so that they are embedded with what is called the applications programmes interface, which is a bit like the equivalent of Microsoft in the sense that they have the levers and the tools to be able to develop and use any applications which are subsequently laid upon them, but the applications would include a wide range of data services, message services, transaction-based services as well as some of the ideas that BT has gleaned from the Martlesham VOD trials. They have really had a very successful experience with transaction-based businesses, and I think that now they are ready to take the experiences from the video on demand trials, to offer a wide range of data and information services to their customers.

Baroness Hogg

335. May I follow that up just a little further, my Lord Chairman? Is what you are describing in effect an attempt by BT to internalise into their systems the software applications that at present you use through your own PC which is then connected through a modem to a telecommunications system? And, if so, is there not a slight worry that BT in a sense is trying to extend if not a monopoly a powerful market position over the provision of IT software by bringing it back into its system and out of the end user product which you buy and simply connect to your PC system?

A. First of all, my Lord Chairman, I should like to emphasise that there is a difference between computer applications and intelligent switches. The top layer of applications that might be developed could look similar to ones that we are familiar with on the Internet or to ones that we are familiar with in a word processing sense in a PC in so far as they seem like text and data and graphics to the user, but the actual inherent switch applications themselves will be different. BT however will be extending their capabilities.

Baroness Hogg] The question was not whether they will be extending their capabilities but whether they will use it as a weapon to extend their market power.

Lord Hollick

336. They could?

A. They could, yes, that is true.

Chairman

337. Ms Hughes, I am afraid that time is defeating us, as it always does. I wonder whether there are any concluding remarks that you would like to make?

A. No, my Lord Chairman, thank you.

338. In that case, thank you for a most interesting session.

A. Thank you, my Lord Chairman.

Memorandum by the Newspaper Society

I am pleased to enclose, on behalf of myself and colleagues at the Newspaper Society, replies to the above enquiry.

Question 1. *What is the current form of the "Information Superhighway", and how is it developing (i) in the United Kingdom and (ii) worldwide? What specific problems arise from incompatible network standards and why are these incompatibilities arising?*

For UK newspapers reaching consumers the "superhighway" is taking the form of Internet services which enhance in some way the basic product (usually the main title). These services are provided at no charge. Some are experimental while others hope to achieve income through advertising.

Some publishing centres are venturing into other areas. *Midland Independent Newspapers* are in partnership with *Mirror Group Newspapers* on a cable television venture while *Yorkshire Post Newspapers* have a successful fax-back service aimed at local businesses.

The telephone should not be forgotten, being available in most homes. Advertising in the newspaper using premium rate calls in lieu of a lineage rate is becoming more common while audiotext services offering information and entertainment are still in their infancy.

In terms of newspaper production the "superhighway" implies a number of new developments enabling news and other data to be transmitted from source to the publishing centre with greater speed and efficiency than before. For example, one area which is currently generating considerable interest within the newspaper industry is that of the digital transfer of advertising copy via ISDN lines. Such electronic transmission from advertisers, advertising agencies or reproduction houses to printing centres is rapidly replacing the physical transfer of bromides and films. Editorial copy is frequently being transferred electronically as well, for obvious reasons of speed and accuracy.

An ideal scenario for many consumers would be to be able to access their local publisher by electronic means for news and information but for searches to encompass a wider area. This requires database compatibility. One way of achieving this might be to invest in a joint programme to examine ways in which compatible databases might be exploited by the consumer, and to measure the benefits from the publishers' viewpoint.

Question 2. *What services are being provided, and should be developed/will be required, within for example the following areas:*

(i) public information,
(ii) commerce,
(iii) finance,
(iv) education,
(v) industrial training,
(vi) health,
(vii) social services, and
(viii) entertainment?

Industrial Training: Use is now beginning to be made of CD-ROM as an interactive learning tool although the costs of preparing the disks is still prohibitive for many.

On-line tuition may be a training process of the future. We are currently investigating the potential of this medium.

Question 3. *Who will supply these services to consumers in the United Kingdom? How can the participating companies be categorised and what is the nature of the commercial relationships between them? How are suppliers likely to develop? What service standards exist and how are they likely to evolve?*

Currently there are no agreed service standards in existence where the traditional newspaper publisher is concerned. As stated above there is a need for agreed uniformity to enable searching across databases.

Question 4. *How can universal access to services provided for the common good be secured within a commercial competitive market framework?*

Universal access with a commercially competitive framework will take some time to achieve without government intervention because high prices can lead to as much profitability based on few customers (those who can afford it) as low prices for a mass market.

Local and regional newspapers have the opportunity to provide local on-line access to information and entertainment services, on the back of which might ride additonal public information services. These might be paid for by advertising or by public services.

Limitations regarding access could be met in the medium term via kiosks strategically situated in public places, accessed via a smart card similar to the ones used in UK satellite decoders. Such kiosks could provide information, home shopping, banking services and print-outs confirming actions and transactions. BT and others have these in prototype form now.

Question 5: *What is the role of central Government in connection with the "Information Superhighway" service provision, including the following areas:*

- (i) leadership;
- (ii) promoting inward investment;
- (iii) promoting and safeguarding the interests of UK firms worldwide;
- (iv) promoting network compatibility;
- (v) access to Government information;
- (vi) security of payment;
- (vii) data protection, confidentiality and censorship;
- (viii) verification of information; and
- (ix) promoting the development of UK-orientated software?

(i) Central Government role generally: Government can help lay the foundations for on-line services which enable the fullest possible public access. This will mean investing in local services such as Internet access (via the local publisher(s)) and providing public access via kiosks (see above).

Government can promote common database standards in consultation with various industry bodies to ensure ease of access for users of such services. The price for this would be "hot links" to sources of government information such as schools reports.

All this is based on the assumption that on-line services will become faster, easier to use and more reliable over the next two years.

UK software and other industries can be safeguarded by providing them with reliable information on likely developments with forthcoming hardware and its likely usage.

(v) Access to Government Information: The Government should continue to develop the work of the CCTA Government Information Service so that more government publications and other material are available on publicly accessible networks. Further encouragement should be given to provision of information in this way by central government, local government, non-departmental public bodies and other quangos. Such material should include official publications, reports, minutes, statutory material and guidance to departmental officials and others on its implementation.

However, care should be taken to ensure that access for inspection and copying of documents in other forms should not be discontinued whilst the general public lacks the means of open access to such networks.

Introduction of freedom of information legislation would facilitate public access and could reduce unnecessary caution on provision of such access on the grounds of confidentiality or data protection.

(vii) Data protection, confidentiality and censorship: The Government must avoid the imposition of new and unnecessary restrictions upon freedom of expression, including the free flow of information, where such barriers would not apply to traditional non-computerised publication. It must also consider the implications of any legislation governing communication over publicly accessible networks and avoid its producing incidental harmful constraints upon other computerised processes (eg "traditional" media publication, whether broadcast or print). Communication of information and its ancillary functions should not be unnecessarily made unlawful nor subject to heavy administrative burdens unrelated to existing criminal liability or private law rights (eg intellectual property). New constraints upon information gathering, "storage", use, access, transmission and receipt could discourage development of the benefits of new technology. They would be a disincentive to innovation and to the exploitation of new applications—and thereby detrimental to the new and traditional information providers and the services which they provide.

For example, the ambit of data protection legislation has considerably expanded since the Act was passed in 1984 because of the growth in computer applications. The nature of data protection legislation could change yet again as the Government implements the EC data protection directive into UK law. The European legislative institutions recognised the threat that the directive could pose to freedom of expression and its restrictive effect upon press and artistic freedoms—not least because of computerised journalistic and publication processes. It will be vital that the exemption for journalistic, artistic and literary processing is sympathetically interpreted by UK law. Moreover, extension of data protection legislation should not unnecessarily inhibit access to, and use of, information, whether conveyed by text, images or sound, from commercial or other databases made publicly available.

Similarly, means of ameliorating the restrictive effect of the law of confidence should be used to encourage better provision of information, including access to central and local government information. Express statutory access rights given to the public, reduction in encouragement of and use of confidentiality clauses could stop the unnecessary withholding of information because of fear of the application of the law of confidence or data protection.

Since the Government has recognised the difficulties of a privacy tort, and rejected the introduction of such a law as a matter of policy, the law should not be extended by piecemeal and incoherent legislation ostensibly justified by "privacy" and "information superhighway" considerations which would complicate rather than simplify communication of information.

Similarly, new legislation should not hastily be introduced to outlaw publication of certain types of material or information, because the material might be carried on a publicly accessible network. Care should be taken in amending and extending criminal legislation to ensure that it does not thereby outlaw currently lawful and uncontroversial publication or publishing processes.

There are areas where clarification of liability under domestic law and vulnerability to overseas law might be helpful so that legislative steps could be taken to reduce liability and thereby encourage further development, commercial or otherwise, by industry of the "information superhighway" and its applications.

Copyright: The law of copyright, currently a focus of Commission attention for harmonisation, will also affect the ability and incentive of publishers to invest in the "new media". It is crucial that the legal structure does not undermine the incentive for "content providers" to contribute material to the "superhighway". Publishers will require a continuation of many of the provisions in the Copyright, Designs and Patents Act 1988. These include: moral rights exemptions in a newspaper context (print and electronic newspapers) as well as provisions giving employers copyright ownership in works produced by their employees (section 11). Without these provisions—under threat from the harmonisation process—publishers will be hindered in their ability to place information into the public domain electronically. Hindrances would occur by, for example, having to acquire permissions, consents, licences from persons involved in multi-contributor works, all within the highly time-critical business of newspaper production and distribution. We enclose the Society's response to the European Commission's Green Paper on Copyright and Related Rights in the Information Society, which develops these and other points *(not printed)*.

Question 6: *What is the role of local and regional Government in connection with the "Information Superhighway"? How can new services be used to boost (a) the ongoing regeneration of urban areas, (b) other local economies?*

National government can encourage the use of the new communications technologies through the provision of grants for the development and piloting of new and, therefore, high risk initiatives. One example might be the provision of local Internet hosts via the local publisher but offering a wide range of services at little or no charge.

Question 7: *What will be the impact of the "Information Superhighway" on working practices and employment prospects?*

The "superhighway" may result in more people working from home and fewer office administrative roles. This has yet to be proven and comparatively small numbers of employers enable more than a few employees to work in this way.

Question 8: *Is the dominance of mass-market US software a threat or an opportunity? What hard commercial initiatives can be made (as opposed to "collaborative" ventures such as RACE or ESPRIT) to respond to this dominance?*

The US may lead in mass-produced software but tailor-made software is readily found in the UK. The future may lie in UK companies' ability to provide software for specific purposes and suited to British companies' requirements.

We hope the above comments are helpful. We would be grateful to be kept informed of how the enquiry proceeds.

Mary Russell
Solicitor
Government and Legal Affairs Department

7 February 1996

Examination of Witnesses

Ms Mary Russell, Solicitor, Government and Legal Affairs Department, and Mr Richard Beamish, Head of Development, Training and Education, The Newspaper Society, called in and examined.

Chairman

339. Ms Russell, Mr Beamish, thank you very much for coming to see us. Would you like to begin by explaining the nature of your organisation and your role within it and then making any introductory statement that you wish to make?

(*Ms Russell*) Thank you, my Lord Chairman. Thank you for inviting us to give evidence to your Sub-Committee. I hope that our contribution is helpful. Yes, I will begin by describing briefly the membership of The Newspaper Society and then outline the respective roles of my colleague, Mr Richard Beamish, and myself, so that you will have an idea as to who is the most appropriate person to answer a particular question. As you may know, my Lord Chairman, The Newspaper Society is the association of local and regional newspaper publishers in the United Kingdom. Its members publish some 1,400 newspaper titles and these include paid for titles, free newspapers, daily and weekly publications, many of which are being enhanced by new media services, including Internet pages, cable television joint ventures, audiotext and CD ROM technology and other services as well. The Newspaper Society is a member of the European Newspaper Publishers Association which is based in Brussels and which represents most national newspaper titles as well as regional titles in the European Union. We also participate in the International Newspaper Publishers Association based in Paris which makes representations on global issues affecting the press. A number of people contributed to our response to your Sub-Committee's questionnaire. Although I was responsible for compiling the answers in our letter of 7th February 1996 I suspect that my remit may be the more limited one in the context of your enquiry since my role is confined to particular legal issues which affect the ability of our members to exploit new technology and those legal issues may be too complex to deal with in detail this morning and, in any event, my Lord Chairman, I suspect that they are rather on the periphery of your enquiry, but I will be happy to field any general questions on copyright, data protection, moral rights and other issues. My colleague, Mr Richard Beamish, is head of development, training and education at The Newspaper Society and he dealt with questions No 1 through to No 4 on your original questionnaire and most of question No 5 as well as questions 6 through to 8. He has responsibility for new media research and development on behalf of the industry and he will be submitting to you three reports all dated July of last year which result from research that was commissioned by The Newspaper Society to identify and analyse opportunities which multimedia technology will present to regional publishers. The first report is entitled "The Multimedia Revolution". The second is an on-line publishing feasibility study. The third outlines a newly developed methodology to evaluate the suitability of a particular new media venture. Richard Beamish will be able to summarise and elaborate on these reports as well as answering any questions that you might have on the range of the various new media services which our members are offering and any problems that they are experiencing and views on the development of the information superhighway as it affects regional publishers. Lastly, my Lord Chairman, we will also be able to submit to you a copy of our publication called "Reaching the Regions", which outlines the facts and figures of the regional press and is mainly aimed at advertisers, but you may find it useful.

Chairman] Thank you very much, Ms Russell.

Baroness Hogg

340. May I ask you perhaps to enlarge a little bit more on the experience and benefits that have been gained so far by newspaper publishers providing electronic versions of their products and other services on the information superhighway—"experience and benefits" may include disbenefits, problems, snags as well?

(*Mr Beamish*) My Lord Chairman, perhaps I may deal with that. I can provide you with all sorts of lists of activities and so on, but I think first of all it has to be said that I am not sure about the concept of electronic versions of existing products. If you look at the Internet at the moment you will see a number of newspapers (the figure within the regional press varies between 28 and 37 depending on how you define it and, of course, it varies from day to day anyway). Across the world there are many, many more, and the majority in fact are exactly as suggested. They are electronic versions of today's newspapers, and it does appear that one of the early lessons to be learnt perhaps is that the Internet, which is very much flavour of the month at the moment, is perhaps not well suited simply to transposing information that appears in a newspaper into another form. In terms of the more successful ventures perhaps *The Guardian's* GO2 or "GoTo", as it is known, which seeks not to replicate the newspaper but to extend debate and amplify, is a much more effective process. Given that, my Lord Chairman, we can consider some of the benefits perhaps. They are hard to quantify at this stage. People are looking as all commercial organisations will for revenue opportunities or opportunities to enhance existing products, or both preferably. They are not always easy to find because the current audiences are small and estimates of likely take-up in the future vary considerably. I think that we have to be realistic about uptake in the medium term, but there are some key benefits. One example away from the United Kingdom is the *Irish Times* in Dublin which offers a fairly basic version of its newspaper, nothing sophisticated, but it has been very, very successful simply because there are so many expatriates. I believe that *The Scotsman* is looking at this kind of approach as well, so there are certain benefits there because here is a way of giving information to people who would wait days, even weeks, for information which they really do value, and there are opportunities there. We also have to

Baroness Hogg *contd.*]

consider areas such as cable, and the provision of news and other local services on cable will perhaps demonstrate that the local newspaper has more of a content franchise than anything else and needs to move away sometimes from the idea that we are committed just to print on paper. Print on paper is a means of information dissemination, but perhaps what we are really about in local and regional newspapers is content. Finally, my Lord Chairman, I think that we have learnt something from some of the classified advertising on-line which has been not that successful to date, but has clearly shown the potential of some of the on-line services, providing people with very sophisticated searches, but which in fact are easy to use. Of course, that is something that we have been searching for for a long time.

Lord Haskel

341. My Lord Chairman, may I just for a moment pursue what Baroness Hogg called disbenefits. The sort of thing that I have in mind is *The Times* on the Internet from about 10 o'clock at night London time, which means that if you are on the west coast of America you can actually read it the day before you would actually receive it. Have sales gone down because you do not have to wait and you can sort of pick it up the afternoon before? Have you noticed any difference? I just give this as an example. Has it affected the sales of newspapers?

(*Mr Beamish*) I am afraid that I do not have any figures on that, my Lord Chairman. It would be very nice to get the football results before the matches are played! I think that it has to really, yes: I am sure that it would affect overseas editions of some of the newspapers who have a considerable sale abroad. If it does not have much effect yet, I am certain that it will. That then raises the problem in turn of income streams, but there again the cost of distribution is reduced by so much, so maybe that is not such a problem after all.

Lord Haskel] It is free at the moment.

Lord Gregson

342. When I lived in the west coast of America you could not buy *The Times*. I do not think it is a serious problem!

Lord Haskel] I just give that as an example.

Lord Craig of Radley

343. You are aware obviously that our interest in content is a strong one and from that flows then, what are the particular barriers to content provision and what indeed are the main barriers would you say to the United Kingdom becoming a major content provider for the information superhighway and what, if anything, should Government be trying to do about this, or, indeed, is it a role for Government?

(*Mr Beamish*) I think it is a very interesting question, my Lord Chairman, and it is a somewhat difficult question for those of us concerned with the regional press to answer in quite the same way as some others. Part of the problem I think lies in the thinking within our own industry. We still have to understand fully the potential of the very information that we hold, be that editorial or advertising information. We still think in regional terms and the one thing that new media does is move us away from the era of regional information into the era of personal information, which includes local information also, of course. We feel certainly that this industry needs now to work very closely together and maybe across sectors as well, involving not just local papers but national papers and maybe magazines, and also broadcast perhaps to create an information bank providing readily searchable information, but through very, very sophisticated databases so that it is easily accessible and the user does not have to worry about the complexity of the search—it is invisible to the user. It is perfectly possible to do this now. But we have to recognise also that even working together we are comparatively small players; we are not big players in the world-wide market. The one thing that we do have in the regional press in our own communities, of course, is brand recognition, and that can be worked into some kinds of information that we provide even across regions. Another problem I think is a lack of investment in research and development which is perhaps where we vary from some of our American colleagues. I do not think that in many areas the Americans are ahead of us, but they do invest more in research and development; they are prepared to try ideas on quite a large scale, risk failure, absorb failure and move on, and maybe we have something to learn there. But, of course, many newspaper publishers and other media centres are comparatively small in size and that does limit the amount of investment in research and development that can take place, so we are still searching, I think, for the "killer" applications. An example of where I think that the Government can help, and it is beginning to happen now, is the Department of Trade and Industry's Information Society Initiative. Certainly it is early days yet. We have had the grand launch, as it were, and we have had various discussions all the way down the line, but it looks as though it is very much a step in the right direction. There is its support, and not just financial, though that is included; there is other support as well both for trade bodies and for small companies and large companies alike. If we can work together within the sector and across sectors I do not think that there is any reason why we should not be able to make great strides as content providers, but I am talking within a fairly narrow field, of course.

(*Ms Russell*) My Lord Chairman, I can add one point to that. Clearly content is our strength and the publishing community will only want to invest in new media products if there is a legal environment which will allow them to recoup their investment. One key point to that is the ownership of a copyright. The United Kingdom Government has been very supportive in the context of European negotiations to maintain the provisions that we have in the Copyright Design and Patents Act 1988 of which section 11(2) provides that the publisher is the first owner of material which is produced in the course of employment. What that means is that the publisher has a great deal of manoeuvrability in being able to obtain "cleared" information, to have the rights to

Lord Craig of Radley *contd.*]

process it and disseminate the information in whatever form the publisher would like, without being hampered by having to obtain consents and licences and negotiate on an individual level with the various contributors to a newspaper. Therefore, one way in which the Government can continue to help is by continuing to support the "work for hire" concept (which is the European name for this idea that the employer is the first owner of the copyright) because that concept acknowledges that it is the employer who carries the risk of investment as well as responsibility for supervision and overheads and in some cases, legal liability. To require over and above that that the employer obtains consent from individual journalists, photographers and so on to produce an electronic product would be a disincentive to investors.

344. In your view how does that lie alongside the American approach which is going through Congress at the moment where there is an intention, it would appear, to release copyright far more?

(*Ms Russell*) I am not an authority on American law, I hasten to add, but there has been a lot of uncertainty because of a particular case, the *Feist* case, which you have probably heard about. In terms of copyright tradition I think that there are two clear traditions. There is the Anglo Saxon (UK) tradition, which is more sympathetic to a commercial point of view, and then on the other hand there is the European tradition where the philosophy of copyright was designed originally to protect the "artists", so it is a less "commercial" approach. The American approach is more similar to ours, I believe, but we would like to maintain our current provisions so far as they apply to copyright ownership, moral rights and eligibility for copyright protection.

Lord Hollick

345. It seems to me that one of the main barriers to more content being provided is the illusory search for or failure to find a return on investment that is required. Your members—and I hope to become one very shortly—have a rich content in their regional and national newspapers. Have any of them—and you used the expression "killer applications"—found a way of increasing their revenue, generating additional revenue, through the electronic distribution of their content? You cited the very interesting example of expatriate Irish. Are they prepared to pay for the electronic receipt of the *Irish Times*, for instance?

(*Mr Beamish*) My Lord Chairman, my understanding is that the answer is yes, they are prepared to pay. At least, the *Irish Times* is certainly hoping so. Their research suggests that expatriate Irish people are prepared to pay for that kind of service if the price is right and, of course, this is the crucial factor—what is the right price for such a service. I think that there are very few examples in the United Kingdom of on-line services where local publishers concerned are making money. There is a little bit of an income stream, I think, from something such as perhaps Autonet, which is a Northcliffe Newspapers initiative and is what it says it is: it is classified advertising concerning motors in the south west which could roll out across the country, of course, if it were successful. However, in the main there are very few examples of any substantial form of income. There are certain examples, I think, of product enhancement. If we look a little bit further and go across to the States, many of you in your researches may have come across the Mercury News Center in California, and they certainly found that their own newspaper on-line has been so successful that they are able now to charge a subscription. It is profitable, so we understand. People are very happy to have a kind of "Daily Me" whereby they can specify the kinds of information that they are really interested in and have it sent to them by electronic mail. Maybe there is an example there, my Lord Chairman. I think that the key issue is price and audience.

Baroness Hogg

346. There are examples—they are not described as newspapers, but they are nearly newspapers, for example, Reuters subscription service.

(*Mr Beamish*) Oh, yes.

347. That is an electronic publication on subscription, but newspapers somehow have not crossed the divide into that?

(*Mr Beamish*) I think that it also depends on your concept of audience. If we are talking about a general audience such as might be the audience for a newspaper, be it a national newspaper or be it a regional newspaper, which is a very different and more general audience with a smaller area, then it is difficult to find opportunities at the moment because the user base is comparatively small. But if you are talking about niche markets, then there are most certainly opportunities, yes, of course.

Lord Butterworth

348. In your paper I believe there is a reference to regional newspapers taking a lead in the creation of local or regional networks. Are there any possibilities there that are actually being explored at the moment?

(*Mr Beamish*) I think that it depends on how we refer to local and regional networks. There are examples, for instance, of regional newspapers working in co-operation with cable companies providing local news services and with commercial radio, which may not be new media but it is perhaps new media to us. When it comes to on-line developments, then there are certainly a number of services already available, but they tend to be operating in isolation. If you mean by this, in co-operation with other providers, I think that this is probably in its early stages yet.

Lord Haskel

349. My Lord Chairman, if I may I should like to pursue Lord Hollick's point. How would the *Irish Times* collect the money from their on-line expatriate readers?

(*Mr Beamish*) I am not sure of the detail, my Lord Chairman, but they would have to have some kind of

Lord Haskel *contd.*]

a subscription system. I do not think that they would yet collect the money electronically; I do not think that there is public confidence yet that such a system is sufficiently secure.

350. But surely this matter of collecting the money for on-line services is one of the things that must be holding back the development of on-line newspapers?

(*Mr Beamish*) I think that that is absolutely correct. Once there is confidence that transaction methods are sufficiently secure on the Internet, for example, I am sure that that could see a substantial growth in the use of those kinds of services. At the present time you have a system where people will have to pay by telephone or by cheque or whatever, for a very advanced service. You are using quite old fashioned, mechanical means of payment to achieve the end. Then, of course, people can be registered and have passwords or whatever it might be.

(*Ms Russell*) My Lord Chairman, I think that one of the perceived advantages of the Internet is often not so much in terms of the revenue that it can bring in at the moment, but that it is a means of compiling large databases useful for marketing new customers for future use. This can be achieved for a relatively small initial investment. I think that that seems the attraction for a number of papers at the moment.

Lord Gregson

351. The main way of collecting this in the States is on the added value telephone calls. The problem there, of course, and I am sure that it will apply here, is that the hackers' society will provide you with the telephone number without going through the client's number. Have you looked at hacking as a problem in this situation?

(*Mr Beamish*) My Lord Chairman, we have not at this stage, really simply because as there has been no charge for information provision in the United Kingdom to date it does not really come into play. It certainly would if charges were to be made and if those charges were to be significant.

Lord Craig of Radley

352. But have you got a concept of how one would charge assuming that there is a system of doing it? Would you be charging by the page, by the document, by a quick look, by a long look? I have great difficulty in understanding this approach to charging of a document which is made available like this, like a newspaper. Indeed, I might want to read page one of *The Times* and page 2 of the *Irish Times* and page 3 of something else or some particular article, and no doubt in due time a browsing system will allow you to do that, probably learning from my own actions. Is one of the barriers to the whole of this process actually trying to work out how one would charge?

(*Mr Beamish*) I think that it is one of the barriers, my Lord Chairman. I know that the approach of many of our own members and the approach of, say, the *Electronic Telegraph*, which is perhaps the most well known of all the on-line newspapers, has been very much to hope that this kind of venture can be financed entirely by advertising, which in itself causes problems, because if you are, in the United Kingdom, paying for your local telephone call you may, if it is a full page ad, be paying for a full page to download on to your system which will take for ever if you do not have a fast mode, and that can be very frustrating for the user. The solution is to have a ribbon at the bottom or the top of the page which then entices you into the next bit so that you have voluntarily gone on. At the moment I do not know of anyone who is making sufficient money on this, but you have to remember the other side and that is that we do not really see the end of newspapers in the medium or even long term. I think that we see electronic publishing in its various forms as a means of enhancing what we already have. In that sense I think that it is not a replacement, except in the example of expatriates.

Lord Craig of Radley] Or as a form of advertising the hard copy that is already in the newsagent.

Lord Butterworth

353. Newspapers are cheap and they can be read anywhere. Do you know of any research or development that is going on to make the electronic version like the actual version?

(*Mr Beamish*) My Lord Chairman, there certainly have been some developments that take us a little bit further down the road. It is true to say that there is nothing at the moment that replaces the convenience of the newspaper in terms of its ease of access. It is comparatively cheap, you can read it, drop it in the bath, it does not matter too much: it is a very flexible, convenient tool and so on. If you look at the electronic media as it is at the moment, it does not compare in any way in terms of ease of access. There are a number of developments certainly which suggest that we ought not to feel too comfortable about things. There are Japanese consumer electronics companies, for instance, who have been looking at and developing an A4 tablet with a large screen and a highly reflective surface so that you do not really need back lighting. It retains the image when the tablet is turned off, so again you are saving. Maybe it receives its information by wireless means rather than by cable. Indeed, the same organisation has been looking at the possibility of a scrolling or folding screen so when you have finished with it you put it in your pocket. This is getting a little bit closer to the sort of information and the quality of information that newspapers currently provide, so I do not think that there is room for complacency. We have to be looking forward all the time and talking to consumer electronics companies and influencing them as well, and not just Japanese, but one hopes UK companies also.

Lord Hollick

354. My Lord Chairman, I wonder whether I may come to a question which is rather close to my heart, the relationship between newspaper groups and television companies. The Broadcasting Bill is obviously very much going to encourage that. What sort of new products, what sort of new services, do

Lord Hollick *contd.*]

you think can be developed by the coming together either through ownership or joint ventures as between the different parts of the communications industry, the media industry? Can you tell us a little about some of the developments that have already taken place and how you think they might benefit the companies involved and the community generally in the next few years?

(*Mr Beamish*) The only really good example that I have to date is probably that of Midland Independent Newspapers based in Birmingham who have focused very much on their deal as others are looking and seeking to do with Mirror Group and its Live TV whereby at the moment if you are in the Birmingham area and you receive cable, then on Live TV, I think it is roughly two to three minutes in every hour, you can receive local news which has been gathered by the journalists at the local newspaper, and some local features as well. I understand also that this is likely to be increased. It has been successful to date and it will be increased to something like half an hour in every hour of local content. There you have an example of co-operation between cable and a newspaper centre, the same centre offering similar services to and working with local radio on the same kind of a basis. I suspect that as we move forward, however, there will be all sorts of other opportunities. There are certainly efficiencies to be made and maybe there are dangers there as well. The efficiencies can come from joint news gathering exercises, to some degree from some cross promotion; it depends on how far one should take that as well as how far one would want to take that. I think because of the diversification of media that the problems over having too few people covering too many incidents may well not in fact appear because there will be so many means of gathering information as we go along. Birmingham will be the best example of something that is happening today. There are other examples which are currently at the planning stage. It is difficult to say too much more about them. For instance, in the area of classified advertising there are all sorts of areas for very substantial co-operation with a number of organisations to provide a complete service to the would-be purchaser. Motors are a very good example.

355. What about experience overseas? Have you seen particularly effective services that have been developed, for instance, in the United States where cross-media ownership has been permitted for many years? Has that led to the development of new and successful services?

(*Mr Beamish*) I was thinking of some very successful services in the United States involving local newspapers and certainly there are some examples of services involving degrees of cross promotion between radio and some newspapers on the east coast. The majority of the successful exercises that we have seen there relate more to isolated or individual activity than to media working together. However with some of the shopping services on the east coast they have been very successful in the level of co-operation, but I do not think they have concerned the pulling together of news content in a significant way, at least, not as far as I am aware. Obviously we cannot monitor everything that happens over there, and there is a lot going on.

Chairman] It is noticeable that in your written evidence there is probably more on copyright, data protection, confidentiality, censorship, than anything else and, Ms Russell, that probably reflects your interest. I think that we should move on to that general area now.

Lord Gregson

356. You do cover very well on several pages the problems on data protection. You refer mainly to the United Kingdom 1984 Act. We have now got a European directive, of course. I wonder whether you would like to comment on the effect of the European directive on your thoughts on data protection. I realise how discriminatory data protection was in the first place on electronic storage, of course.

(*Ms Russell*) Clearly in general the European directive will be more restrictive than the 1984 Act because it imposes more strenuous requirements for consent and notification and subject access provisions. But the way in which it will impact upon our members' projects on electronic newspapers will very much depend on how it is implemented and, of course, we are awaiting now the Home Office consultation document on the implementation. Much will hinge on what happens in respect of the exemptions which were permitted under Article 9 for any processing of personal data which is carried out "solely for journalistic purposes". If there is a sympathetic interpretation of that and a sympathetic drafting of the relevant provision in the implementation legislation, then that is very much what we are hoping for, because clearly the use of on-line products means that personal details of individuals will be increasingly captured and stored on servers. In terms of electronic newspapers, our members will certainly want to carry on doing the activities that they are at the moment which they are permitted to do under the 1984 Act. But by its very nature, of course journalistic research and published material will contain countless identified and identifiable individuals and that will be the case in terms of feature writing and background research and day to day reporting of current events.

357. You say sympathetic interpretation. That sounds to me like a formula for the United Kingdom being dragged once again through the courts, if we are not careful! Surely we are now dealing with absolutes in terms of European legislation because we have now learnt that we cannot be too sympathetic, otherwise we get grabbed in effect, so there must legally be a sense of what we can and what we cannot do based in terms of this legislation?

(*Ms Russell*) Article 9 does give quite a lot of freedom to create exemptions and derogations in the way which a particular Member State wishes. The Home Office, during the passage of the European directive through the European institutions, did understand our arguments in terms of the difficulties that we could experience if we did not have an exemption which would allow us to carry on our ordinary day to day journalistic activities. We are

Lord Gregson *contd.*]

awaiting that document. We will see what its proposals are and we will comment on them.

358. The Home Office does not have a very good history recently, I think, so there may be a bit of wishful thinking going on there, do you think?

(*Ms Russell*) I would not want to comment on the Home Office's approach to this!

Chairman

359. There is a comment in your paper when you are talking about the central Government role in general which says: "All this is based on the assumption that on-line services will become faster, easier to use and more reliable over the next two years." Now a lot of business decisions depend on that as an assumption. How confident are you about that?

(*Mr Beamish*) My Lord Chairman, it is always difficult to predict, is it not, but if we look at the Internet as of today, although it certainly has very significant business uses, it is still, even with the best technology available, a pretty slow and frustrating form of communication to use. Certainly when you come to some of our target audiences, it does take a degree of perseverance and at least two children to be able to understand how to operate it properly, so it is difficult at the moment. I think that with all these areas we have to look not at what is today but what might be tomorrow, and there is little doubt that the speed of access on the Internet will improve dramatically and that it will become simpler to use. You will not have to use a PC or an Apple Mac computer or something similar and the television manufacturers will include the facility to access the Internet maybe by a cable in a couple of years as part of the set. Games machines that even now, of course, are in many, many homes will also—and, indeed, are beginning to—have Internet available to them. If you have a faster system and a more reliable system and the means of access so that you can simply use your remote control to gather the information that you require, you have something that is becoming very attractive to people rather than just a comparatively small audience of those who are interested in such things or who have very sound business reasons for using it.

360. And is that going to stimulate great developments? What I have in mind is that ISDN lines, for example, have been available for quite a long time, yet your paper somehow gives the impression that they are just coming into use. They have been used in some areas for quite a while. That does not suggest a very rapid take-up of new facilities.

(*Mr Beamish*) No, it does not, my Lord Chairman, but again people have to see the benefits before they take up new technology even if it is available. One of the problems is that if we are not careful we will have technology looking for a market. It is a risk. With ISDN there have been reservations in some industry sectors, for instance, over the price. You may say that it is no more than an ordinary telephone line, but it is not really; it is twice the price because it is a double connection and that can be significantly more expensive to sell. I think that these things often appear and do not find their niche for a while, but once people see it, the take-up becomes much more readily established. I think that it is a matter of the right applications with the right technology and at the present time both are moving forward but maybe they have not come together in the way that we would like them to ultimately.

Lord Hollick

361. In your paper you say that you caution against the over-hasty introduction of legislation to outlaw publication of certain types of material. I wonder whether you could just give us your thoughts on how the Government can approach the problem of censoring certain types of information on the Internet if it is appropriate? When you have it in published form there is a writer and a publisher and you know who to sue, you know who to take action against. So often on the Internet, however, you do not really know where the information has come from—it may have come from another jurisdiction, indeed, it often does, and you may find it deeply offensive and it may be universally condemned, but what action can the Government take to prevent the publication and access to it?

(*Ms Russell*) My Lord Chairman, I think that the answer really lies in encouraging the development of technology to help solve those problems. The control of information is better dealt with, I think, in terms of encryption and "tagging" information—in terms of being able to identify its source, and those are technological solutions rather than solely legal ones. In fact, one of our concerns is that when problems are perceived in terms of electronic publication, there will be an immediate reaction to legislate and to regulate rather than allowing technology to resolve some of the problems where possible.

362. Just to explore that a little further, my Lord Chairman, if there was a particularly unattractive piece of information you could have an electronic fingerprint on it and therefore be able to identify the centre, is that what you are saying?

(*Ms Russell*) Yes. The technology exists (which my colleague can elaborate on) to assist legal problems in the areas of obscenity, libel and copyright in the context of electronic media.

(*Mr Beamish*) My Lord Chairman, the technology exists to censor so-called undesirable items within the Internet—I mentioned something similar to the V-chip which we listened to a discussion on in the cab coming over. That is a similar example. The problem lies in one respect in the copyright issue, of course. That is a very difficult issue and Mary Russell has far more expertise in that area than I have. We are dealing with legislation that was never designed for this form of information. The second one is in terms of audience. First of all there is the moral question, should we be censoring information at all. Once we have got round that question, if the answer is yes, we should, maybe for good reason, ask how do you do it? At the present time there is software available that will restrict access to the Internet. Some schools are using it now and some colleges and that is certainly a possibility. As with everything else, it requires responsible people to define the limits.

Lord Hollick *contd.*]

Lord Gregson] And it can be hacked, of course. If you solve it technologically, it can be hacked.

Lord Craig of Radley

363. Is it really a practical proposition? I accept that the technology is there and I accept that somebody arrives at a moral judgment as to what should or should not be, but with the amount of material that is already around, let alone what will be around in the future, which is accessible by a private viewer through a television set, cable, terrestrial or satellite, it seems to me that one is expecting something which is not going to be feasible and therefore we are driven back once again to a regulatory rather than to a technical approach. Would you like to comment on that?

(*Ms Russell*) I did not mean to suggest that the two are mutually exclusive.

(*Mr Beamish*) My Lord Chairman, my personal view is that I think that that may well be the answer in spite of the moral questions that it gives rise to: it may well be the only way to deal with that kind of issue. I heard on the radio yesterday a discussion about some American writers who have resorted to writing in code to get around the new legislation. The code is so silly and obvious that everybody knows what is happening, and, of course, that is always a problem, as with hackers. There are people who will try and find loopholes in the legislation and try and find ways round it. It is a very, very difficult question, but we have to face it.

Baroness Hogg

364. Is not the key question where the point of legal responsibility for publication should lie? Let us take the example not just of material that may be unpleasant, say, and the question of whether people want individuals to restrict their own children's access to it, but where the information is defamatory or is supporting an illegal activity, the points of contact with drug dealers, that kind of net, where should the point of responsibility for transmission of that kind of information lie? Do you see service providers as akin to publishers and therefore liable, if you like, for what goes through that publication?

(*Mr Beamish*) It is purely a personal view: I suspect that is probably the only option, to look at the service providers. It depends on whether you can trace the information. The service providers should be able to trace the information if there are no other means. It may well be that one has to take that route. There are some very interesting cases in the States involving CompuServe and America On-Line and various decisions. It is a difficult area, but somebody has to take responsibility.

Lord Hollick

365. I think that that is where the electronic fingerprint is very interesting. In the States the case has fallen on the grounds that the service provider while providing access to the Internet is not responsible for what the person then sees on the Internet, and it was a particular case of defamation. They were not able to secure satisfactorily a legal claim against the intermediary, but they succeeded in finding out who had sent it in the first place, and that would seem to me a more effective route.

(*Mr Beamish*) There was another case of another provider who I think claimed to monitor to some degree the content, and therefore that provider lost.

(*Ms Russell*) Perhaps I can clarify. In that case, there were two reasons why the Service Provider was held liable. One was that they held themselves out as monitoring and vetting the material; and secondly, they actually had the software and the screening devices to do it. These circumstances would not apply in all cases.

Chairman

366. I am afraid that once again time has defeated us. Ms Russell, Mr Beamish, would you like to make any final remarks that would further clarify your excellent evidence?

(*Mr Beamish*) My Lord Chairman, certainly we should like to thank you for hearing us. I have some materials for you which I will leave with you. You can read them as you will and feel free to come back to us if you wish.

367. Thank you very much indeed.

(*Ms Russell*) Thank you, my Lord Chairman.

TUESDAY 26 MARCH 1996

Present:

Butterworth, L.	Hogg, B.
Craig of Radley, L.	Phillips of Ellesmere, L. (Chairman)
Flowers, L.	
Gregson, L.	Gerard, L.

Memorandum by Microsoft Corporation

1. *What is the current form of the "Information Superhighway", and how is it developing (i) in the United Kingdom and (ii) world-wide? What specific problems arise from incompatible network standards and why are these incompatibilities arising?*

As we describe generally in these responses and in detail in the attached reports, the "information superhighway" or the "information society" can be explained in three ways: the technology on which it is based; the product and services that it produces and will produce; and most importantly, the benefits and social changes that will result. The information society knows no borders. Its development spans numerous countries world-wide, including the UK where the market and technical infrastructure encourage investment and experimentation in a broad range of computer, content and communication industries.

Digital technology provides the starting point for describing the technical outlines of the information society. This technology has made it possible to convert words, sounds, pictures and moving audio-visual images into digital messages that computers understand. In digital form, these messages can be combined, stored and transmitted over various telecommunications networks much more quickly and efficiently, in larger quantities, and with higher quality than ever before. Digital technology has also made it possible to combine previously distinct forms of communication, such as telephone and cable television, into more sophisticated and versatile services. Users access these products and services by means of "information appliances" that likewise are becoming more sophisticated, including personal computers, interactive televisions, video telephones and other personal communications devices. In short, such advances in digital, interative capabilities are helping to transform users from passive recipients of data to active consumers who can demand, organise and process all kinds of information, works and services in accordance with their particular needs and preferences. We have produced a White Paper on *Creating the Global Information Society: Looking Ahead* which describes the form of the information society in detail; this paper is attached as Appendix 1.*

The information society will obviously realise its full potential only if users can move from one telecommunications network to another and use the same data from one such system to the next. Although the information society is at an early stage, it is already clear that market forces will strongly encourage products that meet these needs. For example, the Internet is a global "network of networks" that is compatible with many different computers, software products and telecommunications systems. The Internet tidal wave of 1995 resulted from the increased amount of graphics-based content on the World Wide Web, and is dramatically reshaping the way that information is published electronically and the way that commercial entities attract and service their customers. The Internet is today an extraordinarily successful, market-based global network—despite its technical challenges and limitations.

Looking beyond "narrowband" communications, the private sector is well on its way to adopting ISDN as a standard for "midband" communications and Asynchronous Transfer Mode ("ATM") technology for broadband communications. These will help fulfil the superhighway's crucial compatibility needs without heavy reliance on a cumbersome administrative process that cannot keep pace with technological change. Government support for *market-based* initiatives for compatibility and standardisation will encourage the development of critical new technology, while avoiding the imposition of technical solutions that soon become outdated in this fast moving field. The private sector, including Microsoft, is already working collaboratively in such groups as the Information Infrastructure Standards Panel (IISP) to ensure telecommunications compatibility.

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*Not printed.

2. *What services are being provided, and (should be developed/will be required), within for example the following areas: (i) public information; (ii) commerce; (iii) finance; (iv) education; (v) industrial training; (vi) health; (vii) social services; and (viii) entertainment?*

Potential information-society applications and services are diverse, embracing entertainment, education, culture and government itself. These will undoubtedly affect many facets of private, commercial and cultural life, and will evolve dramatically to take advantage of the interactive opportunity offered by electronic publishing.

Many UK and global businesses are already using information technology to *expand potential markets and achieve substantial competitive advantages.* For example, technology already facilitates instant payments and crediting of accounts. It helps to maximise the use of personnel and physical resources, such as office libraries and files. High-speed telecommunications lines and electronic mail already enable businesses to co-ordinate their disparate operations and expand potential markets by achieving more efficient communication with clients.

New network operating systems and business application will take these advances further. They will better connect computers and will *improve product development, manufacturing, and other business operations* ranging from market research and advertising to inventory control and purchase-order processing. Computer-aided designs and ultimately virtual reality will bring a new dimension to product design, reducing the time and expense traditionally required to construct and test models. The benefits of the information society will not be confined merely to the world's largest corporations, but will also assist small and medium-sized companies as they become increasingly aware of its advantages as an "equaliser" in competing with larger firms.

These technologies will also have several *benefits in the home.* For instance, they will make it possible for employees to work from home, making working hours more flexible. Increasingly, information technology will also enhance the quality of leisure time. Applications for the home will provide new opportunities for continuing education, easier access to health care, better management of financial services, and unparalleled use of travel information. In addition, video-on-demand technology will expand entertainment options, with a level of convenience well beyond that which is presently available.

Government information and services also can be provided much more effectively via information superhighways. The UK government has taken a forward-looking step in this area by establishing Internet "web sites" for instantaneous availability to the public of government reports and other information. Such initiatives serve to improve citizen access to and involvement in all kinds of public initiatives.

3. *Who will supply these services to consumers in the United Kingdom? How can the participating companies be categorised and what is the nature of the commercial relationships between them? How are suppliers likely to develop? What service standards exist and how are they likely to evolve?*

While the development of the information society is an ambitious undertaking requiring both the public and private sectors to play important roles, massive investments will be required to build the information superhighways. This leads to the inescapable conclusion that the superhighways will principally be a private-sector effort, requiring market-based incentives and rewards in order to succeed.

The private-sector initiatives are not a monolithic building plan, but rather thousands of competing technical achievements by countless individuals and companies in the computer, content and communications field all over the world. These developments "grow together" organically with every passing day, but it is entirely too early to predict the shape that the markets, business relationships, infrastructure, content, standards and services will ultimately take. The commercial participants are still "placing their bets" on a variety of technologies and solutions, and only consumer take-up and approval will determine how these will evolve. The private sector is also working cooperatively in such groups as the IISP to identify all kinds of standards that will be necessary for implementation of the information superhighway.

4. *How can universal access to services provided for the common good be secured within a commercially competitive market framework?*

Promoting broad access to new information technologies and services is a substantial challenge. The conventional regulatory approaches and government subsidies in many parts of the world for the telephone industry are not likely to prove sufficient to meet this challenge, principally because (a) the cost of implementing high-bandwidth telecommunications services is still relatively high, and (b) the prices and options available for the myriad of services and works that will become available on-line should and will vary widely. Narrowband (ordinary telephone) and midband (ISDN) connections to the Internet through existing telecommunications networks offer the best opportunity available today for broad public participation.

Promoting competition between communications carriers in providing both Internet access and higher-bandwidth communications lines, will go a long way towards promoting widespread access to the new information superhighways. The UK's efforts to increase competition in telecommunications have shown positive benefits already: Internet access is more widely available, and at more competitive rates, in the UK than almost all other EU countries, but it remains more costly in the UK than in the United States. ISDN-type lines, which will become virtually a necessity in order for users to have rapid access to on-line works and services, are still prohibitively expensive for ordinary consumers in the UK. This in part results from the small number of carriers offering and promoting such services. Policies that encourage cable companies as well as traditional telecommunications carriers to offer higher-bandwidth communications services at more competitive prices will unquestionably improve access to the information superhighways for all citizens.

Note that the numerous suppliers of information technologies and on-line services have a natural commercial interest in making their services available to as many members of the public as possible. For example, the Microsoft Network (MSN), launched last summer, is competitively priced and is available to any member of the public in the UK. Microsoft's entry into this field also had the natural market effect of encouraging the many other on-line service providers to reduce their prices, improve their services and market their offerings more widely, all of which have served to improve public access to commercial on-line services overall.

5. *What is the role of central Government in connection with the "Information Superhighway" service provision, including the following areas: (i) leadership; (ii) promoting inward investment; (iii) promoting and safeguarding the interests of UK firms world-wide; (iv) promoting network compatibility; (v) access to Government information; (vi) security of payment; (vii) data protection, confidentiality and censorship; (viii) verification of information; and (ix) promoting the development of UK-orientated software?*

While the potential benefits are manifold, the information society also presents many technical, financial and legal challenges that must be addressed if this vision is to be realised. Government has an important role to play in this respect. The creation and success of the information society will depend to a significant degree on the adoption of supportive government policies. Government policy, not simply in the UK but in co-operation with all affected global trading partners, should be guided by several basic tenets, described briefly below.

- *Recognition of private-sector role.* Government policies should be founded, in the first instance, on a recognition that this infrastructure is best built and operated by the private sector. Nonetheless, the government will play a critical role by establishing the regulatory framework in which the private sector will operate. The new information superhighway will be very different from the traditional telecommunications industry, and therefore will require a new regulatory approach.
- *Encouraging of market-based standards efforts.* Because the information society is in its infancy, it is very difficult to determine which technological aspects would benefit from standardisation. In this environment, governments can be most effective by allowing companies to innovate and test new technologies in the "experimental laboratory" of the open marketplace. Maximum innovation, leading to the highest quality products at the lowest prices, will result if companies are permitted to compete. As has already been pointed out, it is now evident that market forces will strongly encourage products and services that allow consumers flexibility to move between networks and systems; users will demand products that give them access to the broad range of information and applications they seek. Given this fundamental aspect of economic life, governments should avoid costly and time consuming processes aimed at setting formal standards. All too often, such standards have exacted "technology penalties" by slowing the pace of innovation and impeding market competition that would lead to falling prices. The private sector has already identified more than 40 standards that will be necessary for implementation of the information superhighway, and is working with such groups as the IISP for a voluntary and market-based implementation of such standards.
- *Protect intellectual property vigorously.* The information society offers enormous potential for the development of both content and the hardware and software that will provide new means for its distribution. At the same time, digital transmission of novels, plays, films, games and other forms of artistic and entertainment expression will make it much easier for pirates illicitly to copy works without remitting fair compensation to right holders, in effect discouraging such holders from offering their works in digital form. The creation of an applications-rich environment necessary to the success of the information society, depends on the affirmation of strong intellectual property rights for companies that succeed in bringing creative applications to market. It is essential therefore that governments maintain the current level of copyright protection for content providers, software programmers and others involved in the development of the information society.
- *Protect confidential information.* The creation of a secure information environment is another area in which government can and should provide leadership. The networks comprising the information society will store immense quantities of information touching upon many facets of personal and business life. If the information society is to be successful, personal and business users, as well as governments, must be assured that the confidentiality of data will be protected. Because of the particularly sensitive nature of the interests involved, governments should take the lead in

developing strong regulatory frameworks that guarantee appropriate levels of data security. In so doing, however, governments should be conscious of the need to ensure that differences between various national schemes do not impair the free flow of information across borders. Effective protection of data confidentiality should be based on the priniciple of informed consent.

— *Encourage commercial use of strong encryption techniques.* At the same time, in adopting such protections, governments should take account of the legitimate interests of data controllers and processors. Governments should also recognise that strong encryption capabilities are needed by virtually the entire range of business users on global networks. A wide variety of encryption technologies will need to be available and will need to change fairly quickly over time, if sensitive data available on these networks are to remain protected. This means that ongoing development and implementation of encryption technology must be led by the private sector, with the support of government institutions.

— *Promote electronic commerce.* Laws in several critical areas, including *contractual relations, consumer protection, defamation,* and *advertising,* were adopted before the advent of digital technology and interactive services. Many of these laws contain formal requirements that may not "fit" well with the new technology, and their potential application to electronic commerce creates potential uncertainty that could delay and even prevent the introduction of new products and services. Governments can be instrumental in modernising these laws to accommodate and encourage the new technology, while continuing to balance the other factors that have been important in these legal fields. Governments can best make a major contribution by taking stock of the existing legal impediments to the information society, and where necessary amending existing laws so as to preserve traditional protections while making appropriate adjustments to take account of this new technology. For example, the validity of contracts formed through online communications should be expressly recognised. Governments can also make a major contribution by promoting, where appropriate, harmonisation measures to achieve greater consistency in the rules governing the responsibilities and potential liabilities of network operators, content providers and others who will help build the information society. For example, UK libel laws need to be amended to deal with the situation of on-line service providers, as we described to the Lord Chancellor's Department recently in a joint submission with other major service providers; this submission is attached as Appendix 2.

— *Continue telecommunications deregulation and competition.* As the UK has recognised, the traditional regulatory preferences and financial supports for a single-carrier telecommunications markets will not work to meet the challenges ahead. Continued liberalisation in the telecommunications market should open it to numerous new entrants competing with each other to introduce new products and services. The net effect will be to accelerate the development of the information society and to optimise its benefits for society at large. The UK's own policy decision to encourage independent companies to compete with British Telecom in a variety of basic and value-added services has been a good one, and has allowed consumers to choose from an increasing variety of diverse and competitively priced offerings. This policy is of enormous benefit for consumers and should be maintained.

— *Use the technology!* The government sector has an important opportunity to lead by example, by increasing the number and types of interactive applications that it uses to deliver public services and information to the citizenry. In addition, the governments can establish research, grant and procurement programs that will encourage the development of other socially beneficial superhighway applications in education, health care, and the delivery of other public services. For example, the US government is now considering the award of matching grants to certain government and non-profit institutions that develop innovative superhighway applications. In this respect, the government is moving beyond traditional concepts of universal service to explore new ways it can ensure that an information infrastructure meets society's needs. Government should also focus on specific public sectors that will play a special role in disseminating this technology broadly, the most important being education.

(Microsoft Limited's managing director, David Svendsen, testified in 1995 before the Labour Policy Forum on the Information Superhighway, and summarised our recommendations for useful government intitiatives in all of these areas. His testimony is attached as Appendix 3.)

6. *What is the role of local and regional Government in connection with the "Information Superhighway"? How can new services be used to boost (a) the ongoing regeneration of urban areas, (b) other local economies?*

The response provided to Question 5 regarding the role of central government, is similarly applicable to the role of local and regional government in connection with the information society. Local and regional governments can likewise accelerate the development of socially useful applications, such as services to remote rural or disadvantaged urban areas, that private industry might not accord a priority. Local and regional governments can and should give priority to projects closely tailored to specific social goals, such as promotion of regional culture or enhancement of public education.

7. *What will be the impact of the "Information Superhighway" on working practices and employment prospects?*

The creation of a new information society holds substantial promise, not just for providing better technology, but for improving many diverse aspects of daily life. The information society offers substantial potential to improve education, increase worker productivity, enhance leisure time, promote broader access to culture, and encourage new opportunities for employment.

While some types of jobs may pass into obscurity, as has happened during every technical revolution since the dawn of time, the creation of the information society will spur increased demand for workers skilled in modern information and communication technologies. This has already been amply proved in the software industry, where direct employment has mushroomed during the past ten years, and where nearly *eight indirect upstream and downstream jobs* are created for every one person employed by the software industry itself.

The Price Waterhouse/Business Software Alliance study of the *Contribution of the Packaged Business Software Industry to the European Economies,* attached as Appendix 4, explains in further detail this positive effect that technology has on employment.

While market demands will go far towards ensuring that appropriate training is available for employees to meet new job requirements, governments can also play a role in organising and funding training programmes, either alone or in partnership with the private sector. Programmes to train information technology professionals in designing new products and services deserve attention. Professionals trained in this area will form the backbone of information infrastructure industries. They will take the lead in innovations in products and services at home and in the global marketplace. Countries with broad training infrastructures through the private or public sectors will be at a competitive advantage in these international markets. Towards this end, Microsoft—working in cooperation with employment agencies in the UK and elsewhere in Europe—has implemented the Microsoft Scholar Programme. This effort, funded from the proceeds of Microsoft anti-piracy activities, trains unemployed workers in information-technology skills which are in heavy market demand.

8. *Is the dominance of mass-market US software a threat or an opportunity? What hard commercial initiatives can be made (as opposed to "collaborative" ventures such as RACE or ESPRIT) to respond to this dominance?*

In the past, only the privileged few had access to computers and information technology. The US-inspired PC revolution, and developments in the software area particularly, are largely responsible for making user-friendly computing accessible to the masses at affordable prices, both in the UK and world-wide. Employment and educational possibilities have likewise increased exponentially with the increased use of these computer technologies. In many areas, the US's success has benefited users in the UK and other countries. It has also provided a huge opportunity for UK software developers who are numerous, capable and highly successful in the international arena.

Of course, no one country, company or institution can create the global information society or make it a success. This will only take place both through global co-operation among interests in the once-separate fields of telecommunications, computers, and software and content providers, and in healthy competition to produce the best technologies at the most affordable prices. For instance, in the UK, Microsoft works with a community of over 2,000 independent British software developers, who create specialist applications or products for personal computers based upon Microsoft operating system platforms. With an appropriate regulatory environment and strong intellectual property protection, the information superhighways offers unprecedented opportunities for talented British developers to enter a new market with winning products. The current growth of European markets for on-line database and information services provide further cause for optimism about the future prospects for British software developers, and a strong information infrastructure is likely to open new opportunities for other types of content producers as well as users in the United Kingdom.

Microsoft Corporation

January 1996

Examination of witnesses

MR DAVID SVENDSEN, Managing Director, and Ms JUDY GIBBONS, Director of MSN (Microsoft's Internet On-line Service), Microsoft Limited, called in and examined.

Chairman

368. Good morning, Mr Svendsen, Ms Gibbons. Thank you very much for coming and thank you particularly for being available just a little early. Perhaps you would like to begin by introducing yourselves and then by making whatever introductory remarks you think would most help us?

(*Mr Svendsen*) My name is David Svendsen, I am Managing Director of Microsoft Ltd and my responsibilities are to look after Microsoft's interests in the United Kingdom and Ireland. Judy Gibbons I have asked to be here. She heads up our MSN, our Microsoft Network business, which is our on-line business, and I thought it would be rather pertinent to get Judy's insights in a little more detail than I could possibly give and perhaps even get you up to speed, because as we speak things are rapidly changing. So I thought that would be rather interesting. I do want to take the opportunity of thanking you for the chance of being here. The Information Highway or Superhighway is probably one of the greatest ideas known to man in terms of the potential to speak to pretty well everyone on this planet as well as accessing a whole wealth of information and ideas and services. Just to give you a potted history of Microsoft and how we fit in in this whole information highway story: Microsoft was founded by Bill Gates, whom I am sure you know or have heard of, and his partner then, built around a vision that there would be a PC on every desk and in every home. That was 20 years ago and when you go looking at Internet and Superhighway and home computing and so on, we have certainly come a long way. But at the start of the 1990s we actually made it a little bit more cogent, a little more tangible. We coined this phrase "information at your fingertips", where we actually saw the PC as a kind of information appliance which provides access to information wherever and it really opened up this whole aspect of Superhighways in that, immaterial of where the information should be, it ought to be reasonably seamless, for the user to get access to the information, be it on their own PC, on a local area network within the person's building or business or even outside on other networks, on other PCs, on other mainframes and so on. Then as the Internet has rolled forward, say, since 1995 with the roll-out of Web technology, the PC we see as very much not only an information appliance but as a communications tool. If you add them both together this is really the driving force at the back of Information Highway and very definitely what really makes up the Internet. The Information Superhighway, which is a term which was first coined, we think, by Al Gore, is an interesting term because it implies a number of things, that it is a road to somewhere, which is interesting because it is a road nowhere, it is a road all over the place, and it implies as a consequence that road-building is down to government and control and planning, etc. Our belief, and I hope that it is yours, is that it needs market forces at work really to make the Information Highway play out to its fullest extent, that there is not a role there for control, that there is a role for regulation and framework to help foster the market forces at work. I would like to touch base on three aspects that we see as very essential for the Information Highway and then maybe cover some issues that we see. There are three aspects that need to be in place: one is certainly technology and computer advances; absolutely that needs to be there and the pace of that is quickening as we speak. Even my Chairman, Bill Gates, I am sure struggles to stay on top with many of the changes. So that is going on and many of us fret that it would be nice if that would slow down. Unfortunately, that is not the case; in fact, if anything, that pace is probably quickening. The second aspect is the infrastructure, which is the telecomms networks that need to be in place, and I think, that whole infrastructure really needs to invite this universal service that we certainly aspired to when the telecomms industry came on strong, but that needs to be extended further. Certainly pricing of telecomms needs to be at the right price point to invite these market forces to generate what needs to happen, but also the infrastructure needs to draw on not only the narrow band which is in place today but the medium band, which is ISDN, as well as the broader band which we will see some time in the future. I think there is a need, especially when we talk about this transition phase, for sectors such as education perhaps to have some help with the infrastructure by making the pricing, the access, much more amenable than perhaps it is today. The third element is in my business, which is the content business, and I think this is absolutely critical over even the other two aspects because you can have the right price, the right infrastructure, the right technology, but without content neither would be possible. That content needs to be useful, it needs to be appealing, it needs to be relevant, and I think there is a role that government can play there. Because whilst it is critical that market forces do have a central role, as the software industry in my world has shown, as the PC revolution has taken shape, there is a role for government in protecting the work, the investment that is required actually to create this appealing, exciting content. So it is very essential that we maintain the United Kingdom's excellent record in having very strong copyright law and this is essential in all aspects. However, there are some issues which I would like to draw on. One is that as the Information Highway, the Superhighway, is rolling out, there is a tremendous impetus for business to use the Highway for electronic commerce and the law as we have it today, the traditional law, is out of sync with what is required in this electronic commerce. The law of libel, the law of contract and so on work differently on the Internet and I think there is a role for government to review the law, the regulations, the legislation, to bring it right up to speed with the requirements of on-line commerce that is now on the Internet and needs to be increasingly so. The second issue is privacy and data protection. I think all legitimate users need to rely on privacy and security of the data, of the information that they have. Encryption is absolutely necessary or is fundamental to the requirements of electronic

Chairman *contd.*]

commerce and business and people would not feel happy, as they do now, to trade openly on the Internet without strong encryption. This is a big issue; it is running hot in the States; it needs to run hot on a worldwide basis, and I think the United Kingdom Government could actually take a leading role in this by implementing best practice. The last element is probably the most wide-ranging and that is to do with employment and structural change. Just like the buggy industry or the quill pen industry went by the bye, so there will be jobs and structural changes that will happen as a consequence of this Information Highway, this information age, as it rolls out. There is, therefore, a need for some change to happen early rather than late. There are too many examples of us reacting far too late and then we are picking up on the necessary social costs that involves. It is good to see that in the United Kingdom there is a view by government and there are things that the government can do on best practice within government, the running of government as a business, but also in the role of education. Education, in my view, is absolutely key to the way that we adapt to the Information Highway or Superhighway to turn cost into benefit and there are things, programmes, happening. It is good to see that PCs are fairly widespread in schools now. I think the big issue is not so much to do with the children, as we know, but more to do with, say, the teachers. The teachers need to be skilled up in the utilisation of the PC and the Information Highway as a tool for teaching, etc. I think there is also a transitory need for parents. Quite often I am asked about the "haves" and the "have-nots". I think the biggest risk will be for parents being in that big "have-not" class, because they will be struggling with what their children are doing, accessing and so on when parents do not have any control over what their children are looking at, being entertained by, etc. or have no idea or no interest in what their children are doing. That, I think, is going to drive further the social cost. So I would like to end on that and I thought I would offer Judy a few minutes to bring you up to speed with some of the more recent changes that have been happening in the on-line world because there have been quite a number of trends that have started to appear in the last month or two which may be pertinent to your deliberations.

(*Ms Gibbons*) We have all seen the incredible rise in the Internet and the phenomenon of the World Wide Web and this has really allowed people to publish themselves without having to go through an intermediary and that is causing a number of different phenomena to happen. One thing that is happening is that, in addition to commercial on-line services such as America On-line, Compuserve and the Microsoft Network, we are seeing a whole range of other Internet service providers. There are about 120 of them in the United Kingdom getting into the business of getting people out into the World Wide Web and you can see an incredible amount of content out there and we believe that represents a real opportunity for British business, particularly in the software and media fields, to reach world markets without having to partner with a distribution organisation in North America or Asia or what have you. Equally well, what you are seeing is as we try and grow the on-line market, which is very small now—in the United States we estimate there are about 10 million users of the World Wide Web as opposed to Internet e-mail; in the United Kingdom we think there are about 500,000 users of the World Wide Web or commercial on-line services, and again there are 3 million Internet e-mail users and the real challenge is to grow that market until you actually get individuals on the Internet with the appropriate controls and ease of use and all the rest of it, then people cannot avail themselves of the opportunity of the Information Superhighway. So as we are working to do that, so we are seeing another phenomenon happen, which is this core technology which has come from academia and from the military originally, as Microsoft and other main commercial organisations put their weight behind it. So that technology is now being used internally in companies, so that very quickly small businesses and large businesses can create their own publishing phenomena in the company and individuals can go around the corporate LAN and get information as easily as they get it out in the public space. Again that creates an incredible number of opportunities to improve productivity and empower departments, and I am sure in time you will see yourself using that in government as well as having a Web site. So in terms of expanding the market, a number of things really need to happen there and one thing we talk a lot about in the United Kingdom is telecommunications because, as you are well aware, in the United States you do not pay for the cost of a local call whereas in the United Kingdom you do and it can be quite prohibitively expensive if you try and use an on-line service during the day. We believe that ISDN is hugely important in terms of mid band because, in order for this to be a really captivating medium, we need much more richness in terms of graphics and sound and ISDN can provide that and give people the performance they need. We have just implemented a new network infrastructure for our service in the United Kingdom in collaboration with Pipex and we support 28.8 and ISDN at every point of access for local calls throughout the United Kingdom. We have made that investment and we would love to see the ISDN market develop really well in the United Kingdom, whereas for the average consumer right now it is really prohibitively expensive, and we would love to see that change over time. We certainly as an organisation have benefited massively from the deregulation of telecommunications in the United Kingdom and we had a perfect example of it when we moved from our existing system, which was X25 and that was a network provided by BT and we had to pay by the hour for it, to deciding we needed a full native Internet access service and as it happens BT were not ready to provide that service, they did not have the infrastructure, but we had a choice of British companies with whom we could work to provide that network. So we have already experienced the benefits of that.

369. Thank you both very much indeed for that rather comprehensive view of the Microsoft perspective. Could I begin by picking up one point that struck me very strongly. Most people's image of

Chairman *contd.*]

Microsoft would be as the company that has provided useful operating systems and all the software that goes with that, and yet, Mr Svendsen, you said rather plainly at one point that you see yourselves mainly as content providers?

(*Mr Svendsen*) Content is software, so we see ourselves very much as a software company, but I think on a more heightened aspect we would probably see ourselves as more of a facilitator through our operating system business, our tools business, which is providing the programming language or many of the tools that are necessary to write the Web pages and so on. As a consequence of that, we are also a content company and one can talk about word-processing either as a tool or as content, but absolutely products such as Encarta or some of the products or services that Judy's business will unfold are clearly in the content business. So we carry a wide range of interests, but the focal point for all that is very definitely centred in software.

Lord Flowers

370. I wanted to ask, for reasons of clarification, a linguistic point. You talk about software being content. That seems rather strange to me. I call a word-processor software; I do not call a data file software; I call a data file the content. I know when you start talking about interactive things these get a bit mixed up but if we are talking about applications—and that is what this Sub-Committee is mainly concerned with—for example in primary schools, then no way, as I understand it, is Microsoft going to become a provider of content in my sense. You will provide, I hope, some useful software to enable the teachers and pupils to learn something but that which they learn would be provided by somebody else. Is that not right? So could we be a bit careful how we use the word "content"?

(*Mr Svendsen*) Yes. Software in its original sense was basically the instructions to make things happen, so that you can have software in all manner of things, be it within your humble telephone all the way through. So everything we do is software. However, to answer your point, our business is, in its classification today, an operating system business, a tools business and a titles or content business. The titles or content business I am talking about is to do with things such as Encarta, some of the on-line services and so on. The tools business I am talking about can actually be word-processing and spreadsheeting as much as programming languages and so on.

Baroness Hogg

371. You have both spoken a little of the very rapid growth in World Wide Web and Internet e-mail and, indeed, one can get some pretty spectacular percentages. Of course, in one sense that is a function of moving from half a dozen to a medium-sized number. We are at clearly an experimental phase with Internet with, if you like, a circulation much on the size of a broad-sheet newspaper but rather less expensive, used by the buyers of newspapers. So may I press you a bit about this incredible thing. Where are the examples of the hugely successful applications already being demonstrated in use on the Internet? We will put aside e-mail for the moment, which is a total communication system rather than a content access system.

(*Ms Gibbons*) If we use the example of the United States market, America On-line has built a business which has 6 million consumers dialling up on their home PCs and that service originally had nothing to do with the Internet. It had a value in the utility of accessing information easily, such as educational information, but the big thing that kept people coming back was the ability to form on-line communities, to meet people in a common interest, whether it be travel to Alaska or gardening or political debate, and through the technology people can share information on the bulletin board or have real-time, on-line chats. That is something I think of when all the attention is on the Internet, as it is today, where there is very little sense of community. There is lots of information and lots of places to go but no communication, and we look at traditional on-line services. What I think you will see develop very rapidly is something like a proprietary service such as our service, which is the Internet and all the good things, the community aspects, a nice, clean, well-lighted, friendly place to go. So I think that is one perfect example of it. I think you will see other examples when on-line you can do things more cheaply, more effectively, than you can do them off-line, but I think they will always complement the existing media. So one can imagine a scenario with travel applications where you could integrate all those wonderful guidebooks that you find in a bookstore, so that it is very easy to find out about a destination, and when you have found out about it, would it not be nice actually to book it, too, as opposed to having two disconnected processes. So I think there are many examples we have in place now, and there will be further rapid development, but sometimes it is actually the intangibles that keep people using the service as opposed to perhaps something tangible.

Lord Craig of Radley

372. One of the things that intrigues me about this is the quantity of information that is available and will continue to become available, the exponential growth of information availability. That in turn then leads to, how does the customer sort out all this plethora of information from that which he wants and how does he know that that which he wants is there? I just have some difficulty with this perception of an ever-growing and expanding availability of information and the information is no good to me unless I can draw from it what I want and use it?

(*Mr Svendsen*) This is clearly in Judy's business area and maybe you could talk about how the forum develops.

(*Ms Gibbons*) It is absolutely fascinating because two to three years ago when Microsoft started its on-line business we thought we could add value in distributing content. We had a slightly different business model for it but we thought this was a good deal if people want to get their content to consumers,

Lord Craig of Radley *contd.*]

and then the World Wide Web happened and we thought everyone could do it on their own. They do not need a partner and so the market gets disintermediated, but once that has happened then there is a different opportunity to aggregate content back together based on a consumer need. Just to give you a practical example of how we are doing with our on-line service, we have the ability that the user comes on, they go into an area, the arts and entertainment category, say, and what we have done is created an on-line magazine about arts and entertainment and in it it has directory listings, as you might imagine, of all the interesting sites, but more than that, it has what we call "editorially guided surfing", whereby we have writers talking about a specific topic such as the Oscars, perhaps, and talking about the different stars and film-makers, and during the narrative we will put in links to specific Web sites. We also have very powerful search engines, so that if you just get on and you want to find something specific you can actually find it. We also have a very interesting news service, in which we have not only editors and journalists taking information off the news wires and producing stories with pictures on-line, in-depth, five times a day, but for every news story we do we have another on-line editor who is searching constantly for Web sites that link in, so that all these really obscure Web sites that are out there all over the world actually get put in context for a user within the main application. That, however, has a long way to go but I think you have identified a key need, and different people need different things. Business users need something different from parents, who are interested in education, who need something different from a guy who is interested in computer software. So once more you get into an editorial role again.

373. The cynic might say that you are adding layer upon layer upon layer. Maybe it is the only way to get to that which you want. I just have some doubts about whether this will prove to be a satisfactory way of making a customer satisfactory service available in the longer term. Of course, there is the excitement and the novelty at the moment, but as a regular user on a stabilised situation—

(*Ms Gibbons*) The beauty of modern software technology and the fact that the Internet is based on standards, it is non-proprietary and everyone is supporting those standards, is that you can do very sophisticated things to make it very easy for users. To give you an example, this is the World Wide Web, not the American Web or the United Kingdom Web, so naturally a person would expect to have a global view of content when they come on to the service, but based on the software they use to log on in the United Kingdom, we can learn about them immediately and say, "Oh, you are in the United Kingdom, let us present United Kingdom stuff here and then other stuff here." Then as they navigate around the Internet they can explicitly or implicitly create a preference profile and based on that preference profile we can represent information and advertising and everything else, so the cumbersome aspect actually goes away.

374. But that then presumes that the customer is being a fairly regular user in order to build up this profile?

(*Ms Gibbons*) That is where business opportunities emerge, where you can create different services aimed at different target groups. So there is an opportunity to target education professionals or caring parents or people interested in pop music, but whatever it would be, whichever segment of society, rather as you would with a magazine, you will see things happening at multiple levels which will really emulate how the media business is today.

Lord Flowers

375. You are talking, if I may say so, as if surfing is a serious occupation. It is great fun to surf around and find what is available and have a quick look occasionally at something that might be interesting, and this is what you have been describing, but if you are seriously interested in something, if you are studying it at school, if you are doing research into whatever it might be, you have your own copy. It may be a CD-ROM, it may be a book, it depends what it is, but you do not try surfing around to make a serious study of anything, do you? If that is right, I very much doubt whether there will be applications of Superhighway, as we can see it at the moment at any rate, in schools, for example, in educational things at all. I would like to know what your comments are on that.

(*Ms Gibbons*) I would say the analogy there is one of a library. You need to go into the library to find the resources you will need for closer study and once you have found the suitable resources you have to decide which ones you need to loan or purchase or rent out or what have you, so that you can work on them individually. The beauty there is that the library is available to all people and it is vast compared with what you could have in a physical library.

376. But you still borrow the book at the end of the day, do you not?

(*Ms Gibbons*) Absolutely.

Lord Craig of Radley

377. But the library at least has been filtered to a certain extent, the quality of the books on the library shelf, at some stage. What is not clear at the moment is what quality any bit of information that is listed on the World Wide Web may have. How do you see the customer being able to distinguish between that which is reliable or unreliable or many variations in between?

(*Ms Gibbons*) It is very important in any filtering process to be able to present the user with the source of the material for them to make their own judgments on it. Again it is a real world metaphor, that you will have trusted brands and trusted sources of information and through different labelling systems that are being developed, such as Platform for Internet Content Selection, we will have labelling technology to make that very easy and the user will be able to say, "Anything that is not labelled I do not even want to see it, and then the information that is labelled, I can examine those labels and understand

Lord Craig of Radley *contd.*]

the origin." Furthermore, this is very different from the physical world. When I look at a piece of information which has been gathered for me based on a search criterion, I can immediately click, go to the origin of that information and see it within the wider context to make sure I am comfortable with the fact that it is information that I do feel is worth using.

Lord Butterworth

378. You raised the question early on about the important contribution of education and then when we continue to discuss the World Wide Web and so on we see content quite often in international terms, but we have a National Curriculum. Who is creating the content which will enable the National Curriculum to be pursued in depth by your systems in the classroom? If we are connecting all schools, who is responsible for the content which is going to enable the National Curriculum to become successful?

(*Ms Gibbons*) I would say our responsibility and that of other companies involved in Internet is to make the software available to make the creation of curriculum applications very easy. I think it is the responsibility of the people today, the educators and people in government who specify the National Curriculum, in the same way as paper materials are created working with those people and publishers also to take the opportunity to create on-line materials, and it really takes an expert in the given subject area to understand how you can deploy the resources of the Internet to enrich the learning experience of the student in that particular area. It is not something that we would propose to do at all because we do not have that expertise, but what we are doing very much is investing in tools, for example, to create the on-line magazine I described that would be sufficiently easy for a teacher or a publisher to use, which would present Internet resources within a learning context and also would have the power to filter out access to other materials that were not appropriate for use within that classroom session or generally within the school.

379. I realise that goes on but is there a danger that the material that is so produced will be in a sense peripheral? If I am a teacher in a primary school and I have the responsibility for teaching the children the beginnings of mathematics, is it any good my coming to you? Can you tell me where I can get the content in order to enable mathematics to be taught at that level?

(*Ms Gibbons*) We would not propose to do that. What we do do in our work in education is work with people who are involved in creating materials for the National Curriculum. We would not propose to do that ourselves. It would not be Microsoft you would come to.

380. Would you know who would do it?

(*Mr Svendsen*) Yes. There are a number of organisations that we speak with and sometimes we actually help sponsor some of this material, but essentially it is down to these people. They are much closer to the teaching and the material that is required for this course work, and whether this material is found in their libraries or whether it is found on the Internet or wherever, these people ought to be able to come up with some well-rounded view which would then give a much crisper view for students and teachers to access this kind of course work.

381. But if I am a worried primary teacher and my school is being equipped and my interest is mathematics, who would you advise me to go to in order to discover the content?

(*Mr Svendsen*) I do not know a party off the top of my head and I do not even know if there is a registry of such folk. I would assume that even without the Internet aspects there are specialists within the United Kingdom education sector who actually have that kind of material at their fingertips, and I would hope they are working diligently to extend that view out into the Internet.

(*Ms Gibbons*) I can see two distinct sources. One is the existing educational publishers, the people who make a business of providing learning materials in the classroom, and I would expect all publishers to see on-line as an opportunity to extend their business, so that if you are creating exercise books for the teacher to use in the classroom or on mathematics and there are additional resources you can create with the Internet that work with the book, then I would expect that to be an opportunity for the publisher. Secondarily, there are companies who just do educational software in the United Kingdom and we work with many of those and we have an example where we have taken our encyclopedia, Encarta, and we have worked with an educational software company to look at areas within the National Curriculum where this could be a resource and have created lesson plans for specific age groups that fit into subject areas of the National Curriculum, where you could use Encarta, which is an encyclopedia on CD-ROM, to have specific exercises where they could look up the information and use it. So that is an example of how we will provide a core capability and it would be exploited by a software company or a publisher.

(*Mr Svendsen*) I think this probably goes on now. You get the reference books at the end of a chapter or at the end of a lesson and the teacher is talking about a list of books for those keen students who would like to do further reading. I can see a situation which may actually happen today, as I was saying, where you get your two or three extra books and a couple of Web references and they are actually having access to the Web and drawing those references through with the articles convenient.

Lord Craig of Radley

382. Just as a postscript to that, what I would understand from this is that as a content provider you do not see yourselves as a broker as between the user and providers of material such as the example that Lord Butterworth was talking about. Would it be fair to judge that, in your particular case, you do not see yourselves as a broker of information but as a provider of certain information which you have identified as probably marketable?

(*Mr Svendsen*) Yes.

Lord Craig of Radley *contd.*]

383. You might indeed have decided this was marketable but it is driven by that approach?

(*Mr Svendsen*) Absolutely. We are not a broker, we are a facilitator, as I was saying, which is a fairly interesting role because at some points in the market you do more and at other times you do less. We are certainly working with teachers and so on in the education sphere in the early days for, for instance, getting access to the Internet. I am sure we are talking to many people about how they can create excellent course work as a consequence of that. But it is not our role; we do not see this as part of our business.

(*Ms Gibbons*) The simplest way to think about it is that we are very customer focused and if you look at education customers they ask you for a lot of things, and even if you do not do it yourself, if you care about customer service you work with the people who can provide the solutions you need and put together the component parts, and that is really what we see our role as.

Baroness Hogg

384. Mr Svendsen, you raised the issue of the negative aspect in relation to data protection, copyright and so forth. Can I ask you to say a little more about where specifically you see the problems are at the moment and could I also ask you to give us your views on the issue of responsibility for publication of defamatory, illegal or otherwise undesirable material within the context of the written medium, in other words, the publisher and the writer. The equivalent of the publisher is presumably the service provider. What opportunity for abuse and redress do you think should rest with the service providers if the information is accessible through them?

(*Mr Svendsen*) I think the United Kingdom is pretty well set up with its Data Protection Act to safeguard privacy in the matter of data and information. The transfer of information is, as I was saying, rather a thorny issue on a worldwide basis. Business, I think even people acting in their own interests, would actually like stronger encryption to make sure that electronic commerce works well and there are moves in the United States to make that weaker, to have clipper-type chips, etc. The industry, as well as lots of other people, would think that is not the right way, that there are other ways of doing that. But really there is a fundamental need to have stronger encryption in order to facilitate electronic commerce, which opens up tremendous benefits for the United Kingdom. That means the small business here as well as general and large business. So then we come to the role of on-line businesses and that is a challenge and I will ask Judy to detail this. We all know of the issue of the court in Bavaria issuing edicts and Compuserve in the United States having to pull a service because of some regional court. It is a very difficult publishing model when people are publishing in real-time, but if you have advanced notice then there are things that on-line service businesses can actually do about that, and have done something about it, but there is a real worry with certainly the legislature in the United States and certainly in the United Kingdom. We have actually made a contribution to the discussions here in the United Kingdom, that we think that the interpretation of on-line services needs to be brought right up to speed with what is the very nature of on-line service versus other publishing media.

(*Ms Gibbons*) We have worked with Compuserve, with America On-line and some other on-line services to provide input to the libel law that is being devised at the moment, and what we are saying is that at the moment you could view us as a common carrier and so we have no responsibility whatsoever. The problem with that is that that discourages us from intervening and adding value, and a great value that the moderated on-line service can provide is this sense of community and moderation and setting standards. So we do think we have a responsibility both to uphold the law and to take steps in removing material that is inappropriate or illegal. What we cannot do, though, is be responsible before the act. We can only exercise due diligence when it has come to our attention and we can go in and take it off and we think we should be held liable for that. The analogy we use is that it is like running a train system in which you have all these carriages and you have all these people in the carriages but you cannot be held responsible for what they actually say to each other within those carriages. So if you have a system where the publisher is held liable and if you are a common carrier you are not, it does not allow this middle ground in the middle where we think there is a lot of value to be added, where you have a moderated environment, but in the world of everyone contributing, everyone being a publisher on it, every participant, we need to have a way that we are liable but within realistic constraints. That is really how Compuserve and America On-line have been operating in the United States for many years and we would like to see that continuing.

385. I see your difficulty, but after all, the real-time problem is not new. Television companies are liable for what may be said in real-time in live interviews.

(*Ms Gibbons*) I think it is the sheer volume of this. You are talking about literally hundreds of thousands of messages being posted in hundreds of forums on a service every hour of every day globally and the people in those communities do a very good job of moderating behaviour on the service already and there is an escalation procedure established where you just send an e-mail to Sysop if something is going wrong, and then it is our responsibility at that point to come in and fix it and take the appropriate action. But if we end up in a binary situation where it is one thing or the other, then people who have managed services will be forced to become common carriers and wash their hands of it and then the customer has a less good experience than they would otherwise have.

386. Is there at least a partial solution in the labelling system you were describing earlier? If the supplier of the material is clearly labelling, then there is at least someone else who is potentially liable and, therefore, restrained in what they do?

(*Ms Gibbons*) Yes, and that worked terribly well for published information, for written content or visual material. Where the law of defamation can occur is actually where people are in chats or bulletin

Baroness Hogg *contd.*]

boards where individuals are posting information. It is like a letters section of a magazine but the letters get published straightaway and we cannot be an intermediary to their publication, otherwise the system grinds to a halt and it would not work. So I think labelling would help a lot and moderated forums have been proven to work today and I think they are better than unmoderated forums.

Lord Gregson

387. You said in your introductory remarks that there is a certain basis of law relating to copyright, etc. in the United Kingdom which is pretty sound but in fact we are talking about a global service. It does not matter what the law is in the United Kingdom, does it? For a local network, yes, but for World Wide Web then do you not need some degree of understanding or agreement on a worldwide code of practice?

(*Mr Svendsen*) Absolutely.

388. For instance, do we start first with Europe because we are very close to the European situation? Does that need a code of practice to be established, and then do we need a worldwide code of practice, because without it you have nothing, have you? I know the American situation; the wire laws are very strict and there is very extensive case-law on the use of the telephone in America. You can be caught on almost anything in America if you use the telephone for it, but that does not exist in the United Kingdom, for instance. There is so much variation around the world you are almost in an impossible situation if you are global, are you not?

(*Mr Svendsen*) Yes. I think what you are saying is spot on but where do you start? I think the United Kingdom is showing best practice, certainly with copyright law. That is also the view in Europe. It needs to be acted upon in certain countries within Europe and I would say even enforced, but I think largely in Europe we are in reasonable shape. I do not have a view about what you mentioned about the United States telecomms laws. In the United States similarly we are in good shape. There is copyright law and so on, but this is a global business, as Judy was saying, and when we get into some of the more exotic areas of China and India and so on, we, either as a company or as an industry, have had our challenges in, say, mainland China. There is a law there which, unfortunately, is not being enforced. So you can get laws but you also need the enforcement of those laws. But your comments are absolutely true, that this is more of a country thing. It is actually more of a regional thing but you need to start somewhere, and, fortunately, the United Kingdom is in pretty good shape.

389. Can I go on to another question which has been raised, the question of encryption. The commercial use or uses of Internet or any other open system for commerce must depend on encryption, as you say, but encryption is an incredibly difficult problem. You probably know that the United States and the United Kingdom and several other countries limit the degree of encryption you are allowed to use, that it is all defence-based, in effect. You are only allowed to use a level of encryption that can be bust, in other words, so where do you go from there? If you go to that level, whether it is 1012 or 1014 the amount of equipment you need to encrypt and then interpret is extremely expensive. It is a large piece of computer equipment, but even that level can be bust, if you see what I mean? So I am not quite sure where you go from there really.

(*Mr Svendsen*) My technical level, in terms of the power that you need to read messages that are encrypted is marginal, but I do not think you need powerful systems actually to take in an encrypted message or whatever, but certainly in terms of busting the encryption, absolutely. The stronger the encryption key, the more power you need, which is one reason why electronic commerce needs strong encryption and there are various measures or options around. One is the United States clipper and the other is this third-party escrow idea and so on. I think ultimately there will be some compromise but once more this is a worldwide issue. It is not just something for the United Kingdom or just for the United States. There are also aspects that the United States are looking at, which is the industry's view that the narrowness of the United States encryption plans to date is actually hurting their business, their export earnings, and this is something to which I think the United Kingdom should also be sensitive.

Lord Craig of Radley

390. If you postulated that it would not be possible to arrive at a satisfactory encryption facility, in other words, that either it would be hacked or it could be too expensive or was not allowed by government, if you were to postulate such a situation, would you foresee a Superhighway, World Wide Web, Internet example which was going to be commercially viable other than as an advertising medium and for e-mail use?

(*Mr Svendsen*) I think the Internet applications as we know them today will continue and thrive, and Judy spoke of those businesses, but the really exciting growth area is in this electronic commerce area. That is where the social aspects of Information Highway ought to benefit. It is about freeing up handicapped people, aged people, people in country areas and so on, where they can get access to shopping precincts and theatre bookings and so on and so forth. So without the appropriate level of protection, that part of that Internet world, electronic commerce, will suffer. It will not grow as vibrantly as it should, and what we are talking about is the multiplier effect here. But I think probably where it will end is that there is going to be some finite point where it is okay for central governments to spend billions required in power to crack some encrypted message and they may say, "No. No organised crime is probably going to be justified in spending this type of money, so maybe that is a fine point and so we need to get to the encryption that gets us to that point." But things will move on, as we know, and that price point will get higher and higher, the power band will get bigger and bigger. So my view is that there will be a compromise, that it will be somewhere in the middle, as is usually the case, but clearly it does need to get much better than the level of encryption today, where you get

Lord Craig of Radley *contd.*]

students who are breaking it literally within a couple of hours as a joke.

Lord Flowers

391. Does one have to use encryption for most purposes? A lot of people ask their banks to pay their bills. Can you have a virtual bank or a set of virtual banks and they can do the encryption between themselves? You do not have to do it, you just tell your bank you have a bill of so much to pay and will they please pay it for you?

(*Mr Svendsen*) That may be possible.

392. I mean concentrate encryption in a few places?

(*Mr Svendsen*) Yes. Business will always look for a secure environment. They do not want to have people tapping into their own system, which sometimes has been the case. We have all read about many of the hacker stories. So I think you need to reach some sort of framed environment where people feel secure that by putting their Access number on this or instructing their bank about that or even sending some e-mail to mum, it is not going to be read and accessed by the great unjust out there.

(*Ms Gibbons*) Another spin on that is that is where the opportunity exists when it becomes a mass media and everyone participates. If you look at what has happened with electronic data interchange (EDI), which allows companies to do commerce together, those specifications have been in place for over 15 years and in the United Kingdom there are a couple of hundred companies actively using EDI at the moment—maybe it is more—and it is big company to big company, government department to aircraft supplier, and the small companies, who also do business with these organisations, cannot get in on the act because they cannot afford all the technology and software development required to make it work, whereas the incredible thing about the Internet is that it is a great leveller. Everyone can be on the Internet, the small companies and the big companies, and therein lies the benefit of business opportunities for companies in the United Kingdom. So the thing is that unless we get to universal, trusted security on the Internet, it will really hold up everything.

Lord Craig of Radley

393. Can we go back to this business of regulation, bearing in mind it is an international business. There is, for example, in the maritime arena the International Maritime Organisation that goes about its business in a whole variety of ways for the benefit of regulation of the use of the sea. Do you envisage, or would you subscribe to, the idea that there should be an international—whatever you like to call it—Superhighway organisation based on that type of thinking?

(*Mr Svendsen*) I think my opening comment has to be a principle, which is this open market principle that will really make the Internet thrive and the Information Superhighway show its true benefits. There are frameworks upon which the Superhighway will need to reside, one of which is standards, some technical and some non-technical, and I think we are moving in non-technical terms. There will be a sense of some regulated environment or added principles which could be built around telecomms parts or infrastructure, etc. So on what basis would that be? I cannot even think about it other than in the technical standards area, and we and many other companies do meet at industry body level. We talk about these technical standards and we agree technical standards and these standards move forward, but they are all based on open market considerations. In non-technical terms I do not know what form that would take.

394. I accept that the technical problem may very well be left to interaction on a commercial basis between companies who are interested in that. I was interested more in those areas such as copyright, the suitability of content, security and so on. Maybe they have a technical element to them but I think more generally they are viewed as a social or political activity and therefore presumably, if we were to go to such a thing as this, would need a government push, an international push by governments?

(*Mr Svendsen*) Certainly government interest and influence but I think this industry censorship idea, which has a technical and non-technical angle, is actually quite a useful example of this in practice, although it is not in practice yet. Would you like to talk about that because I think that is the interesting area where you get these principles?

395. This is a form of self-regulation?

(*Mr Svendsen*) Yes.

(*Ms Gibbons*) I think there is a lot of merit in what you have suggested. How you stop it turning into something like the GATT talks I do not know but there is certainly merit in it because these things will have to be reconciled in some way, shape or form and we would hope we can all contribute to that so that you do not end up with a situation where whole nations just cut off access to the Internet, if that is possible, for all their people because they feel it is too dangerous, and nobody would like to see that happening. But it is hard to envisage how you would do it and I would suggest it would need to be a collaboration between governments and industry for it to be effective because the market dynamics of the Internet are what is driving it forward, but equally well, it has to be driven forward in a responsible way. I think there is merit in it.

396. The thrust of my question was not so much exactly what it might do in detail but whether you would see such a regime as detrimental to or helpful to the progress of your business and other businesses like yours?

(*Mr Svendsen*) Yes, there is the potential that it could.

397. Could what?

(*Mr Svendsen*) It could actually be detrimental but maybe there are some positive aspects to that. As Judy was saying, this whole Information Superhighway is accessed by people. There will be 200 million people who will access this by the year 2001, so they say, and, therefore, you have a very fast-moving, dynamic thing happening. Like my comments about the legal environment, it is lagging behind what is actually happening today. So there

Lord Craig of Radley *contd.*]

needs to be a framework or safeguards, things like copyright, things like privacy provisions and so on, that actually provide the bedrock, the principles upon which all this activity can actually work. That is the environment that I think government should really be focused in on such that they are not stalling but they are actually thinking through the issues, and in a sense a little bit my business. It is growing very fast but I cannot think about the business as if it were yesterday, I have to think of it in two years' time. In a sense I think that is what government needs to be thinking about and also the aspect of training and education.

Lord Gregson

398. The history of leaving these things to industry is not very good, as you probably realise. We finished up with three television transmission systems, two video-recording systems, we now have five digital encoding systems for broadcasting throughout the world and are likely to have six or seven enhanced television systems. So the industry record on this is not very good at all, is it? Does it not need some superpower situation to knock heads together and say, "This shall be the standard and this shall be the system," because the record is awful?

(*Mr Svendsen*) I am not exactly up to speed with some of those industries. I can certainly talk about my own industry and say it is working very well.

399. Only now. Think of all the architecture that has been floating around, the great battles that were fought only six years ago in the States?

(*Mr Svendsen*) That is exactly where people in interested parties did actually get involved and did try and take a premeditated view of the so-called standards, and the consequence of that was that everyone took their own version of that and created their own versions and tried to keep it to themselves. I guess that is something similar to the TV industry, although I am not an expert in that. Certainly in our business we have definitely fought any aspects of that and we have worked diligently with the market and with the industry to make absolutely sure it is a real open system rather than the open system to which you are referring. But I think that the importance of market dynamics comes into play here and I think that is a tremendous force and it is something that the business sector knows and trusts and can actually live with.

Chairman

400. In your opening remarks you attached some importance apparently to the lack of charges for local telephone calls in the United States and how much benefit there would be in the United Kingdom if the same sort of system applied, but those of us who try to use the Internet, particularly in the afternoon, discover that access to it is extremely difficult. It is as though a sort of Parkinson's Law applies or maybe it is an M25 Law that says traffic expands to overload the resources available to it! So if local telephone calls were, in fact, free in the United Kingdom it would make it worse, hence perhaps your emphasis on ISDN as the next step up and then beyond that the Superhighway, but do you envisage this same law, as I have described it, applying as one goes up through these levels and do you see that as a limitation on the development of the system?

(*Ms Gibbons*) We are in a very early stage of the Internet and it is a very immature market right now. What is going to happen very quickly is that people are going to start differentiating their services based on performance and you can do a lot. For example, I can only speak to our services but by investing in Internet access in the United Kingdom we have invested in putting a backbone from the United Kingdom across to the United States and into European hubs, too, and we have bought capacity on lines there and so we have dedicated capacity to take our users out to the United States, so that means that our users get a good experience. In order to stop hauling all this traffic across to the United States, what you can do is replicate the information and so we can do it in a whole variety of ways. I will not go into the details but with software we can basically predict or follow what the popular sites are and we can mirror them or replicate them and we are building a data centre in Europe and in Asia to do that. So ultimately one of the differentiators of one service versus another will be the level of performance they are able to provide a user for the majority of the content they want to get at. If you want to access a very specialist site on an unusual topic which, in fact, is on a small PC in someone's bedroom in Guatemala, at the end of the day when you travel, when you eventually try to get to the person's bedroom in Guatemala, you will be going down a very thin pipe and it will be very slow but you can still get to it if you want to. So that is really going to happen pretty quickly and ISDN will make it happen all the more quickly and it is very important.

401. And as you get into new systems such as Java, which Microsoft has taken some interest in, I know, where you are providing additional features, video sound and all the rest of it, then the demands on capacity are likely to increase, are they not?

(*Ms Gibbons*) Yes, absolutely.

402. Will that exacerbate the problem?

(*Mr Svendsen*) Yes. That is where the need for universal access ultimately to ISDN will be very necessary, and through the years even broader band than that. So I think those applications will drive that and it is very similar to the way in which the PC industry has actually evolved. The more people use it, the cheaper things get, the more business or content is attracted, the more people get access or want to get access to that. You get a spiral and the technological advances that need to underpin that need to be there because if they are not, then that growth or that spiral will be hampered. So there is no view forward that says it is a pessimistic view, but clearly the user needs to have a good, positive experience when they get on to the Internet and we are talking about that today, which maybe was not the case six months or 12 months back.

Baroness Hogg

403. The computer industry has grown with greater and greater sophistication in the combination of hardware and software that the end user has. Now, with interactivity, do you see a future in which a good deal of that technology will disappear up the pipe and the end user's lap-top or whatever tool they have for access will become a relatively simple and relatively cheap connection point to a sophisticated system in which all the software, all the services, have, as I say, disappeared up the pipe?

(*Mr Svendsen*) The history of even our part of the computer business would say that is not the case, but you have a point in that there will be multiple types of devices. There will be your hand-held, there will be the set-top boxes and so on and so forth, but the PC will be around. It will be used by the majority of people because they have the option to use that to download, to have all the material that they need to run their lives on their desk-top or their portable, and so that need will not change. The format of what that will be—it could be a writing tablet or a fold-up or something or other, but that will not change.

404. But there will be a price change, which is what I am driving at?

(*Mr Svendsen*) Price is an issue but price is less of an issue. I think it is more the usability aspect, it is the set-up. People want basically just to plug it in. They also want it on all the time so that all you have to do is give it a nudge or turn it on and bingo, you are where you were yesterday or last night. So those types of advances need to happen. Our company is central to that and we are doing something about that in the next iteration of our operating system. So those are the sorts of things that users need and there will be some requirement to download things from a central database but they are more likely to be movies, the on-line information that Judy was talking about, but they will not be, "Can I borrow the word-processor today because I need to do a document." People will not be interested in that. What they are after is, "My PC is a tool that I can deal with my life with, manage my business with or whatever," and not just having to wander around aimlessly accessing a central database or repository.

Chairman

405. Mr Svendsen, Ms Gibbons, I am afraid time has defeated us, as always. We could go on for a long time, I am sure, but would you like to make any concluding remarks in no more than two sentences?

(*Mr Svendsen*) I am gratified to be here. I am gratified that this session is happening. I am gratified that I live in the United Kingdom where we seem to have lots of things in place and I hope that some positive aspects will come of this meeting.

Chairman] Thank you both very much for your very illuminating evidence.

WRITTEN EVIDENCE

Memorandum by Aspen Consultancy Ltd

I have received a request to submit a response to the call for evidence via the Engineering Council.

Aspen Consultancy specialises in the area of "call centres" and on "marketspace" (doing business beyond time and place).

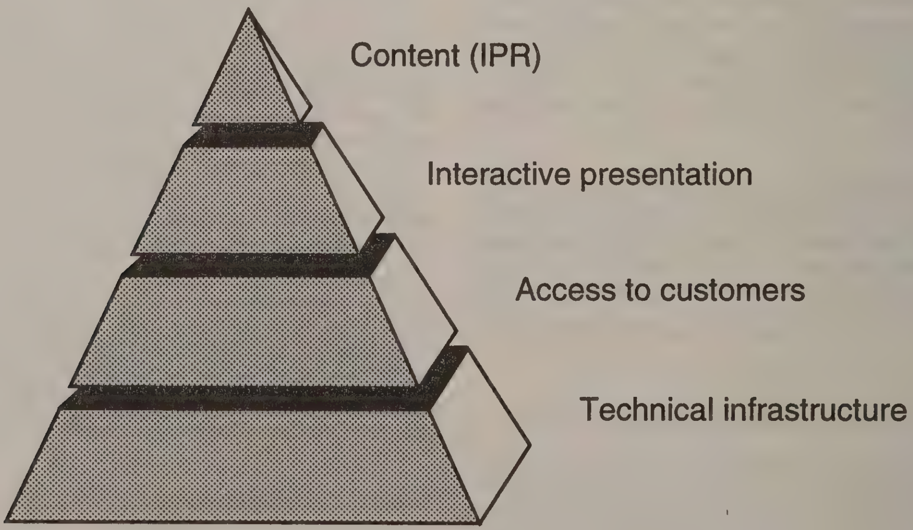
Call centres are the offices in which customers contact businesses and where ideally the whole interaction is carried out on the telephone (the telephone channel). Example clients include British Airways, Directline, Hewlett Packard, Mercury Communications, Microsoft, Oracle, Harrods and so on. Pan European call centres are particularly important since, through deregulation of telecommunications, the labour force operates from one country to service others.

The concept of "marketspace" represents the "electronic channel" of communication with customers. This may involve the use of the Internet or the distribution of CD Rom Catalogues and a myriad of other applications. Example clients include Lendlease (who are building Blue Water, the largest shopping centre in the country), London International Group and NPI.

Having lectured widely on the topics of pan European call centres and the topic of "From Marketspace to Marketspace" (see attached paper; International Convention of Shopping Centres, Vienna, March 1995 and CIBSE Conference October 1995) it is a matter of great concern that the issues of "where the jobs go" should be understood. Call centre businesses create many jobs for the country from which they operate. Recent well publicised examples include QVC and Delta Airlines.

I believe it requires different business models to understand the fundamental changes in how business can and will operate in a "digital" world. I believe it is imperative that national governments understand these new models, so that they aggressively exploit the opportunities rather than try and defend themselves against an invisible invasion.

The business model for a digital distribution chain I favour is shown below:



The argument is that investment in physical infrastructure will not pay ultimately—the cost of calls in Europe will go down towards zero as the fibre networks' capability for huge traffic capacity is exploited.

The infrastructure must be there but it requires partnership or ownership with the other layers of the model to make money.

"Access" to customers or markets (databases) is very useful. Even better is knowledge of an individual customer's needs which database technologies and telephony techniques allow us to capture and re-use. The phrase used is "a market of one"—the ability to recognise individuals and meet their individual needs.

"Presentation" of information to customers which is both relevant and entertaining is a key skill emerging from the "games" environment into serious business applications. In a world of information overload it is essential to be able to capture the attention of consumers and businesses and to present only the most relevant information from the enormous range of products available.

Finally the "content" (or intellectual property rights), the programmes, the stories, the data which customers may be trying to access is the essential ingredients in the model.

To illustrate the model, BT may have the infrastructure, Compuserve the access and payment mechanisms for customers, a specialist agency may design the presentation and the content may be a catalogue of information.

Why is this model so important?

To illustrate it, a recent client in a high tech distribution business was thinking of developing on-line information and ordering systems to reduce costs. By taking information supplied and presented by manufacturers, presenting it well and signing up its dealers to a commercial network it could simplify the traditional distribution channel. The problem is that once the commercial network supplier has signed up all the dealers and the competitor's dealers (owns the "access" to the market) it can strike deals with the manufacturers (for "content" and presentation) and then create an electronic marketplace to offer, order and settle the payment electronically. Since in this case many of the goods are software, which is traditionally shipped on disk, even the product could be sent electronically. The distributor is not needed. The model can be expanded world-wide for the global supply and distribution from central points to all points. The country distributor (the jobs) are moved out of the country.

The jobs disappear to two or three critical points and the rest is electronic. A "marketspace" has replaced a marketplace.

One can consider the same replacement in areas such as financial services, recruitment agencies and so on. In a UK dependent on service businesses this is crucial since the jobs to support the infrastructure and information can be anywhere.

Of course the regulator can step in but in general the opposite is happening, witness the entry of foreign life insurance companies into Germany upon deregulation.

I have not attempted to answer all the questions you pose in your call for evidence but I would venture the following.

The role of local and national government should not be to finance these developments nor to try and defend traditional markets.

The role must be to educate and promote education at both the early years and the executive level. Once aware of the opportunities rather than just the threats, investment from the private sector is easier in order to grow the appropriate skills in this country.

I would be happy to expand on these views further if appropriate.

Peter Massey
Managing Director

17 January 1996

Letter from the Bank of England

Thank you for your letter of 20 December addressed to the Governor, about the inquiry the Sub-Committee are commencing into the information super-highway. As I explained on the telephone, the Bank of England's direct involvement in it is relatively limited—as a small private user of the information services and as an interested observer of the technology for banking purposes. You said that you were primarily interested in the Bank's evidence for our views on the use of the information super-highway for electronic banking and on the security of electronic transfers. In fact all the main banking networks—such as those used for high value payments (CHAPS), gilt-edged and prospectively equity settlement (CGO and CREST respectively)—are private networks using well-established technologies with high levels of security, both in terms of confidentiality and reliability.

There is a separate set of issues where a public network, such as the Internet, is used for "electronic banking". At present in almost all current cases involving the Internet, it is used as a communications medium for distributing information about companies and their products. However, there are developments which will allow the Internet to be used to purchase and pay for these products, in much the same way as a telephone could be used—for instance by exchanging credit card details. There are also plans to offer home banking facilities over the Internet.

In addition to these developments, there are some experimental electronic money systems being developed which involve the exchange of value which is stored on computer networks. Probably the best known is "Digicash". The development of these uses is an issue of interest to the Bank, as the banking supervisor, because we would wish to ensure that "depositors" are adequately protected. But the network is international and it is also important to try to develop an agreed international approach to regulation of its use for banking purposes. The central banks of the major industrial countries, which meet regularly in Basle at the Bank for International Settlements (BIS), have established a number of working groups to consider the issues raised in general by proposed e-money schemes (some of which are based on cards rather than the Internet), including the security aspects. As the groups have only just begun their work, I am afraid there is not very much that I can say about their likely conclusions.

J M Trundle
Private Secretary to the Governor

17 January 1996

Memorandum by British Association for Information and Library Education and Research

HEADS OF DEPARTMENTS AND SCHOOLS COMMITTEE

STATEMENT ON INFORMATION POLICY AND THE INFORMATION SUPERHIGHWAY

INTRODUCTION

In recent months, a number of documents have been produced which set the scene for the development of information policy in the UK. They include: the Bangemann Report,[1] the HEFC issues paper on IT and the Future of Higher Education,[2] the CCTA paper on Information Superhighways,[3] the Report on the Review of Public Libraries,[4] and, most significantly for this Statement, the Technology Foresight report on *IT and Electronics*,[5] from the Office of Science and Technology. Central to all of these documents is the belief that effective use of information technologies is vital to the improvement of the wealth creating potential of the British economy.

Over the past 30 years, the Departments of Information Studies in the UK have played an important part in education and training for the effective application of information technology. The early application to computers to library "housekeeping" matters in the 1960s and the continuously increasing significance of on-line numerical, full-text, and bibliographical databases in responding to information needs in business, industry, academia, and the public sector, has meant that the Departments have had to keep up with developments and change curricula substantially.

The significance of these developments is recognised in the existence of the British Library R & D Department as a *de facto* "research council" for the field and in the award by the Department for Education of studentships and bursaries for taught courses and for research training.

This document presents the views of the Heads of Departments and Schools Committee on information policy issues surrounding the development of the "Information Superhighway" (ISH) in the UK.

THE INFORMATION SUPERHIGHWAY

Government needs to be aware that the ISH is developing and will develop without regard to attempts to control it: what is needed is not control, which is impossible, but actions to ensure that the worst effects of commercialisation are minimised and that the real values to the communities served (lay, academic, scientific, etc) are gained.

One of the key issues is the need to avoid the emergence of information-rich and information-poor in terms of access to electronic sources of information—there should be equal right to access irrespective of financial status, location, employment, employer, disability, education, etc. One might look to the emerging "smart-card" technology to identify either those able to pay, or those in need of public subsidy.

References

[1] Commission of the European Union. *Europe and the global information society.* [Bangemann Report]. Luxembourg: The Commission, 1994.

[2] Higher Education Funding Council for England. *IT and the future of Higher Education.* Bristol: HEFCE, 1995.

[3] CCTA. Information Superhighways: opportunities for public sector application in the UK. A Government Consultative Report. London: CCTA, 1994.

[4] Aslib. *Report on the Review of Public Libraries.* London: Aslib, 1995.

[5] Technology Foresight Panel on IT and Electronics. *Progress through partnership, 8: IT and electronics.* London: Office of Science and Technology, 1995.

INFORMATION POLICY AND ITS PLACE IN GOVERNMENT

Because of policy decisions taken by the present Government, the location of responsibility for information policy is diffuse. At different times and for different purposes, we have had statements from the Cabinet Office (Office of Science and Technology), the CCTA, the Department of National Heritage, and the Department of Trade and Industry. This diffusion of responsibility has meant that no coherent policy has so far emerged and attempts, for example, to extend the remit of the National Commission for Libraries and Information Services, has met with a blank refusal on the part of individual ministries.

Clearly, no coherent policy *will* emerge unless a decision is taken to locate responsibility at the heart of government.

We recommend, therefore, that the Office of Science and Technology is the appropriate office to be given responsibility for overall information policy and, in collaboration with individual ministries, for ministerial action on the issues dealt with in this paper.

EDUCATION AND TRAINING IMPLICATIONS

Impact on education and training

The ISH will have a significant effect on all levels of education and training, both in presenting materials for learning and research and in providing the potential for network-based learning and collaborative-training. Information access in schools and further and higher education needs to be fostered and the role of the librarian in these settings as facilitator of learning must be recognised and encouraged.

A number of projects are in train to encourage schools to connect to the Internet and to begin exploring the use of Internet resources in teaching, but more needs to be done to ensure that the remit of the school library is extended into that of a *learning resource centre,* with all the necessary technology for effective learning.

Education and training for effective application

The Technology Foresight report on *IT and Electronics* makes the mistake of assuming that education and training in computer science is all that is needed to ensure the effective utilisation of computer systems. In fact, nothing could be further from the truth: business and industry have rejected the outputs of computer science departments for many years and have turned instead to those whose general educational background and wider range of skills enables them effectively to introduce and manage computer systems. Hence, dual degrees in information technology and other subjects, offered mainly by the former polytechnics, have proved much more "marketable" than the degrees of computer science departments.

The Departments of Information Studies are among those offering a practical view of computer applications and, in particular, making their students aware of the significance of information *content,* as well as of information technology. Thus, there has been a development of Information Management courses, where the focus is on managing the information resources of organisations, as well as on the value to organisations of external information on the legal, political, scientific and technical, and business environments.

The Foresight report—and those who contributed to the workshops organised by the Panel—is right, however, in suggesting a need for an increase in the number of studentships and bursaries available for taught, "conversion", postgraduate courses in the field. The Departments of Information Studies have many more applications from well-qualified graduates than can currently be supported from the funds made available by the Department of Education. This year, the field suffered a 10 per cent cut in bursaries and the whole funding situation is currently under review, with further cuts likely next year.

The attitude of the DfE appears to be that students should be prepared to pay for postgraduate education, but many students now emerging from undergraduate courses have loans to repay and the debts they are carrying are a major disincentive to paying postgraduate fees and the necessary living costs. However, even if self-funding was possible, it seems appropriate to ask whether it is *desirable* for national information policy to depend upon it. An urgent review of the situation is needed if qualified people are to be available for business, industry and the public sector.

We heartily endorse the Foresight recommendation that:

> "An increased supply of ITEC conversion and training courses and places is needed in the further and higher education sectors. Such courses largely exist, but we need to put more students through them. The major barriers to this are: the lack of studentships and the lack of places. Existing courses tend to be already oversubscribed. It will be necessary to divert resources into the IT area to stimulate a higher throughput to meet the increased demand."

In reviewing the funding situation, the need to support part-time students, returners and others who may be able to cope with costs if grants are available to cover fees. Such students are rarely supported by their employers and relatively small, fees-only bursaries could have a significant effect.

It might be argued that higher level NVQs provide an answer to the problem: our response is that training alone is not the answer—the pace of change demands flexibility, imagination and creativity—these demand an educational preparation.

The costs of IT support in education

The universities in which the Departments are located have committed major resources over recent years to appropriate levels of information technology support.

However, the replacement costs are significant, year-on-year, and many institutions are now finding it difficult to maintain appropriate funding levels.

Unlike business and industry, where relatively low level systems may remain in use for several years beyond their theoretical depreciation period, universities must provide the latest technology and software if students are to play a significant role in implementing effective systems and services. Thus, the annual renewal cost for a PC, with network connections and software, may be something in the order of £1,000 a machine—with hundreds of PCs in numerous laboratories, the cost soon reaches levels that are difficult to maintain.

We recommend, therefore, that consideration be given to these costs and how they may be met by adequate funding from central resources.

Information research and the ISH

The IT and Electronics report draws attention to the need for research in a variety of areas related to the Information Superhighway. For example, it notes that the following areas need research funding:

> *user needs:* covering areas such as information access, repackaging of information, electronic publishing, information management and archiving, and information overload;
>
> *information retrieval:* including "automatic content-based indexing, analysis and transformation and retrieval of information resources in a whole range of media and from small to very large scale", and the creation of "intelligent agents" for customised retrieval from distributed systems; and
>
> *information businesses:* including on-line information services, electronic publishing, "Data mining, extraction, refining, filtering, screening, marketing and recycling . . .", and health information systems.

In the past, these areas have *not* been well supported by the Research Councils and, as a result of the reorganisation of the Councils, the level of support from the EPSRC for information retrieval has actually *declined.* The awards made available by the Department for Education, together with the research supported by the British Library R&D Department have been the main means of sustaining research in these fields.

The role of BAILER institutions

The member institutions of BAILER are the main academic departments in the UK with responsibility for research in the fields set out above. As information systems and services have come to depend more and more on computer systems and electronic networks, so research in the field has come to deal with related issues.

The significance of the Departments as research centres is recognised by the Research Assessment Exercises. In the last RAE, for example, two Departments (City University and Sheffield University), attained the maximum rating of "5", and three (Loughborough University of Technology, Strathclyde University, and University of Wales, Aberystwyth) attained the rating of "4". Much of the research in these Departments is in the areas mentioned above.

RESEARCH FUNDING

Research grants and contracts

Research funding for these areas, which, we suggest, are of crucial significance for national economic development is in an anomalous state. Normally, research funds for academic institutions are channeled through the Research Councils. However, in this area, the British Library R&D Department (BLRDD) is the de facto research council, as a result of an agreement that transferred the Office for Scientific and Technical Information (OSTI) into the British Library when the latter was established. The terms of that agreement make it clear that the BLRDD was to play a national role in research funding and that it was not to be simply a department of the Library.

Over the years, however, the BLRDD's funding has been seriously eroded. If it had the same money in real terms as it had at the time of the transfer of OSTI, it would now have about £12 million in disposable funds—the actual figure for 1994–95 is approximately £1,300,000. Had this erosion not taken place we feel justified in claiming that the state of research in the UK would be somewhat in advance of its present position.

One of the unforeseen consequences of the erosion of BLRDD has been that it finds itself unable to pay overheads on research grants and contracts. This poses severe difficulties for academic institutions, which have been urged by government not to undertake work for which overheads are not available, except where the work is commissioned by a charitable foundation.

- We recommend, therefore, that the position of the BLRDD as the de facto research council for the field should be reviewed, that the Department should be moved from the British Library to the Office of Science and Technology, and that its research funds be restored to levels that are appropriate to the increasing importance of the field.

Research studentships

The situation with regard to research studentships is as anomalous and uncertain as the funding for research grants and contracts. At present, approximately five research studentships and two post-doctoral fellowships are made available annually by the Department for Education. These awards are allocated by a committee representing the BLRDD, the DfE and academic institutions.

While the committee does good work in allocating grants, it is not possible for a department to develop a coherent research policy on the expectation of receiving awards for specific pieces of work. The Research Councils, on the other hand, make some quota awards to approved institutions and there is little doubt that even small quota allocations for approved research programmes could have a significant effect on the development of research relevant to the Information Superhighway and its applications.

Again, over the years, the amount available for grants has declined and the level of grant is so low that where a student has the possibility of a job, he or she is likely to take the job in preference to the award.

If this trend is allowed to continue, research in the fields covered by the Departments is likely to decline significantly:

- we recommend, therefore, that the level of grant for postgraduate research should be reviewed, with a view to raising to a level that will attract research submissions, and that the number of awards and manner of their allocation should also be reviewed.

CONCLUSION

The issues raised in this paper are too complex and interwoven to be dealt with quickly—they need careful consideration and interweaving with other aspects of Labour Party policy—on education, on research, on support for business and industry, and on information policy generally.

We recommend, therefore, that a Working Group on the Library and Information Service implications of the Information Superhighway be established, to consider the issues further and to advise the National Executive on policy implications. BAILER's Heads of Departments and Schools Committee will be happy to nominate individuals to serve on that Working Group.

Professor Tom Wilson
University of Sheffield
for Heads of Departments and Schools Committee

17 June 1995

Memorandum by the British Computer Society on behalf of the Engineering Council

The definition of information superhighway as "a publicly accessible network capable of transferring large amounts of information at high speed between users" is a simple and useful one.

It incorporates the two important characteristics which together offer the potential for the development of new business and greater consumer choice. These are (a) high speed, and (b) public accessibility.

In order to maximise the potential benefits it should be a network which is using the latest high speed technology and is both widely available and affordable. Although the necessary technology exists, in reality it will take time to provide the highest speeds to all potential users at an acceptable cost. However, benefits can still be considerable with a less than ideal solution.

THE INTERNET (QUESTION 1)

The only current candidate for the title Information Superhighway is the Internet. The Internet is a global network of networks. It is not homogeneous in that some parts are high speed (eg the new UK academic network SuperJANET) whereas the majority of end users are restricted by the fact that they are connected to the network by a standard telephone line of limited bandwidth. For this reason many people would say that the Internet does not qualify as an information superhighway. Whether or not you take this view, it is highly likely that any future superhighway will have evolved from the Internet. It is the best available role model we have for how such a network might be used.

All parameters by which the Internet might be measured have been and are growing at very high rates—this applies to the number of end-users, computers attached, use by commercial organisations, service providers, the World-Wide-Web (www). Details of new pages of information available via the www are a regular feature of most daily newspapers. There are many statistics detailing this growth: see references 1 and 2, for example.

The Internet is composed of government networks, commercial networks supplied by companies whose primary business is the provison of network access to end users and private networks, some of which offer commercial data services in addition to facilities they have for their own use. An example of the latter is CymruNet which operates on top of the Welsh Water network.

The Internet is global in scope. For a map demonstrating its extent see reference 3. It uses standard communication protocols, TCP/IP, which are universally accepted and facilitate its rapid growth.

The United States position (question 1)

In the USA the Clinton administration has unwaveringly argued that building an information superhighway will be of major importance for economic growth in the United States. This approach is due to a number of shifts in the US economy:

- First, the labour pool will diminish as the population ages.
- Second, the labour force needs new skills to remain competitive in the "information age".
- Third, the interaction of interest rates and inflation affecting the cost of money for investment.

The US administration appears to believe that the building of an information superhighway for the country's future is just as important as the building of a physical transport infrastructure was during the country's past. Hence the development of the National Information Infrastructure (NII) initiative.

Because the Clinton administration has placed so much emphasis on using/encouraging IT to foster economic growth, many state and local governments seem to be making similar efforts towards similar goals. Many consultants believe that state and some local governments will continue to evaluate:

- using IT to assist their daily responsibilities
- providing citizens access to public information
- becoming service providers
- creating a telecommunications-rich environment to attract new businesses.

This trend will probably continue to grow, but mostly at the state level rather than the local level.

The private businesses that will gain the most from pursuing information superhighways are the information service delivery providers. However, the private sector's vision of the information superhighway cannot reach its full potential unless Congress removes a number of legislative constraints. Some recent federal judgements should provide the short-term stimuli that private sector suppliers need to start investing in the broadband-based deployment of information superhighway services. The size of the task (re-engineering tens of millions of households for more capacity) may take from five to ten years to build.

Over the next five years, most private sector efforts are likely to focus on entertainment, but entertainment alone will possibly not justify all the necessary investment. In the US the market for information, telephony, entertainment and similar services is enormous. The revenues could approach $800 billion. Unfortunately, few suppliers if any, know what people want and how much they are willing to pay for it. Entertainment offerings alone would not provide a private-sector suppliers with enough revenue or ROI, nor can they rely on households spending more disposable income for new services.

Services (questions 2, 3 and 4)

In addition to the electronic mail capability which has been available for a number of years, there is a growing list of other services provided via the www. These are provided by such companies as telephone operators, international publishing and entertainment groups and include:

- Information: newspapers, many national newspapers offer an on-line electronic version.
  TV listings, the ability to get customised lists for individuals weather forecast information (see reference 4)
  government provided public information.
- Employment: on-line employment agencies.
- Retailing: an on-line shopping centre offering a range of different goods is provided by Barclays Bank on its Barclaysquare page (see reference 5).
  Electronic bookshops.
- Travel: hotel finding service.
- Education: on-line Encyclopaedia Britannica.
  Tour of the Louvre.
  Free electronic copies of "classics" which are out of copyright.

There are many other examples and they are growing in number all the time. We are likely to see a continuing growth in all areas but especially those for which the service can be delivered electronically. These include information of all kinds, professional advice on legal, financial and medical matters, education and entertainment.

There is concern over mechanisms for making payment for such services. Customers are reluctant to provide information about their credit cards over public networks. This can be avoided by registering with a service provider and supplying such information over the phone or by letter and then simply using an identification number. Encryption is another possibility and a popular form known as PGP (Pretty Good Privacy) is available. Security remains a general issue with the use of public networks when conducting business and it will undoubtedly remain a focus area as criminals become more sophisticated.

The expansion of entertainment services leads quickly to the potential for video-on-demand and interactive entertainment. These are areas where the speed of the network links is important and existing telephone lines inadequate (techniques of data compression are being used in an attempt to overcome some of these difficulties but it is unlikely that this will prove to be an adequate solution for all needs). The cable TV companies are currently active installing high speed links to many homes in the UK—these are usually coaxial cables rather than the optical fibres which give the greatest speed potential. Some other companies (including some utilities) are investing in broadband fibre networks across the country with the final link to the consumer using high frequency wireless (33MHz) communications. BT is currently not investing in the provision of such high speed connections to individual consumers since it is not permitted to provide broadcast entertainment services which are seen to be the most commercially attractive way of recovering the considerable capital investment and making a profit.

The global nature of the Internet means that services can in principle be provided from organisations anywhere in the world to consumers anywhere in the world. This represents a huge opportunity and a competitive challenge to UK suppliers of service. It also provides a potentially enormous choice of services to UK consumers. From an engineering point of view it is important that any services are provided on an infrastructure with the right quality and to agreed standards. The custodianship and review of such standards is of primary relevance to the engineering profession which should participate fully in ensuring that such custodianship is free from as much commercial and political pressure as possible in order that the qualities of service supplied to private citizens, education, government and commerce etc. are compatible with their activities.

The global nature of Internet also means that no individual government can alone influence the nature of its use, except in a restrictive sense of denial of service to its citizens. This however also presents opportunities for major trading blocks such as the European Union to exploit business opportunities over the Internet if they harmonise their regulations relating to such business—eg payment methods of security, taxation regimes etc.

In general Internet is seen to be a new route to market for many service providers and its success will depend upon the extent to which any inhibitors can be overcome.

INHIBITORS

As indicated above, there are two main aspects to the successful exploitation of an information superhighway:

- creating an environment favourable to the establishment and growth of suppliers;
- ensuring end users can readily use services provided.

Service suppliers will be inhibited by:

(i) The lack of harmonisation of international legislation which ensures they can conduct business in any country. Some of the more obvious examples are individuals rights under consumer law, differences in advertising standards, the fact that some countries prohibit the sale of certain goods and services on grounds of decency or health concerns or because of local religious beliefs and because of differences in tax charges on the supply of goods and services.

(ii) The need for secure payment for services. The problems with transmission of credit card information was mentioned above. Large credit card companies are investing in improved security techniques in an attempt to address such problems. This relates to the wider issue of electronic cash where the UK has had a technological success with the MONDEX experiment. There are, however, still problems of public acceptance of such new developments.

(iii) The lack of intellectual property protection for the services provided. Many of the entities which are currently protected by different intellectual property law, eg written material, music, artwork (images) and films (moving images) can be readily transmitted electronically. It will be very difficult to control the unauthorised exchange of such information.

In addition the types of information that can be protected vary from country to country. For example, directories of names can be protected in the UK but not in the US.

(iv) Clarification of defamation law. What is the liability of a network service provider if a network user publishes defamatory material using the network? There is no explicit UK law to cover this.

(v) Inadequate network security and reliability. The need for secure payments has already been mentioned. There is in addition the need to protect the information being transmitted. Adequate data protection for information on personal medical records is one example. Network reliability will be variable. The overall reliability of the Internet, when transmitting e-mail for example, is very high. However it is possible to have poor reliability in some of the component networks. Commercial network service providers can be oversubscribed and have more users than their network can handle resulting in a user's inability to access the service at will. There is a danger that the proliferation of such service providers who cannot supply the required level of support for their customers will result in many users rejecting the network as a viable way in which to conduct their business. The number of end users using the services of the network will depend on the perceived value and the related costs. Although the number of individuals connected to the Internet today is growing rapidly it is nowhere near the level of penetration of the telephone or television.

(vi) Cost is a significant inhibitor—the cost of a personal computer to connect to the network and the cost of the connection itself. The PC costs are typically of the order of £1,000. This is a significant sum for the majority of people and it will probably need to come down to around £200/£300 before it is seen as just another item of consumer electronics. Network connection equipment in this price range is likely to be provided by manufacturers this year. It will have far less function than current PCs but will provide access to the Internet and its associated services.

Connection costs can probably best be reduced by the introduction of more competition. This is being done with the advent of cable TV providers, however a significant inhibitor to the change is the inability of the users to own their network address (phone number) independent of the network service provider. In order to ensure effective competition in phone line and call cost, it is essential to allow consumers to retain their existing phone numbers.

This general situation can be contrasted with the United States which currently dominates the Internet in terms of suppliers and users. This must in part be due to the lower cost of electronic equipment in the US and the fact that there is no additional charge for local phone calls. If the same conditions existed in the UK there would be a growth in the number of users and a benefit to the associated service providers.

Government (questions 5, 6 and 8)

Leadership

Leadership is the most critical of all the roles the Government could play. A culture of "information sharing" can only be forthcoming as a matter of government policy, if support for an information superhighway is generated and lead at the highest level. This will promote information sharing via a range of services between private citizens and between educational institutions and when appropriate and suitably legally underpinned, between commercial organisations.

The effective use of application enabling technology by government in the delivery of its core services can be a powerful stimulus to the wider deployment of technology. The introduction of Minitel in France is a good example of the impact such leadership can have.

Promoting inward investment

An openness of policy and public debate on where the UK could benefit most from investment of any sort would help inward investment to occur. Any departure from adherence to international standards would be damaging to this cause. The country has a good record on inward investment and the Government should continue to promote it.

Promoting and safeguarding the interests of UK firms

The IT industry is global in scope and very competitive. The Telecommunications industry suffers from considerable differences in the regulatory regimes that apply in different nation states. Ensuring that the overarching service industry is fully deregulated in as much of the world as is practicable as soon as possible would help UK companies acquire a fair share of the market at home and abroad.

Other than ensuring that the correct legal frameworks are in place to support UK IT and telecommunications industries and providing appropriate support via trade missions, export credit guarantees etc, the role of government is no different than for other industry sectors.

It is also important to remember that this is a new arena which is very dynamic, and in which the successful companies in the long term may be very small or not even in existence today. It is vital to have an environment which nurtures companies with this potential.

Promoting network compatibility

This is primarily a technical issue which is dealt with by the main commercial network providers and the national and international standards bodies. Government's role is one of promoting the concept of international standards and providing some small financial support to aid the activities of the international standards bodies. This should be continued and focused on those activities that support the inter-operability of international networks and, of increasing importance, network based services.

Access to government information

An information superhighway provides an excellent method for Government to provide information to people, both nationals and non-nationals. As long as the standard methods are used (eg using the www) then this will help to encourage the use of networks amongst the population. Given the current limited access to such on-line information it will be some time, if ever, before it fully replaces conventional information sources.

Security of payment, data protection, confidentiality and censorship

These items have been covered above. There is clearly a major Government role in ensuring that appropriate controlling legislation is in place without inhibiting the exploitation of the benefits to be gained from the use of the superhighway by UK businesses and consumers.

Pornography is an area which needs special mention since it is a matter of great public concern. The legislation relating to the sale and distribution of pornography already exists and is probably adequate to cover network access to such material. However, the enforcement of this legislation is likely to remain a matter of concern until the general public can be persuaded otherwise.

Verification of information

It could be argued that other than to support standards for technical methods, no further government involvement is needed. However, the escrow process and the concept of "trusted third parties" for electronically stored information and in support of verification of electronic signatures and certificates is more difficult than for paper-based information. Continued government action is necessary in this field in concert with the legal community in order to achieve a uniformity of approach necessary for multi-sectoral approach.

Promoting the development of UK-oriented software

A great deal of software is currently generated in this country through a combination of UK owned companies and non-UK owned companies. The global nature of the IT business is such that this is likely to continue. This area of trade is under competitive pressure from countries such as India and Malaysia which have a well educated workforce and a good network infrastructure connected to the global networks. Two important factors need to be addressed.

(a) to ensure that all software companies—wherever they are "owned"—find the UK an attractive place to develop their products because of the presence of a well-trained workforce and a supportive infrastructure;

(b) to be careful that software companies with closed proprietary standards do not dominate the business. The use of open standards should be encouraged.

Service levels

As mentioned above, it is important that acceptable service levels be defined and publicised. Rather than hoping that a laissez-faire approach will allow this to happen it could be accelerated by a Government-led initiative employing an appropriate watch-dog organisation.

Local government

Local government authorities could promote the use of networks by providing local information using them and by providing local access points in public places (eg libraries) to enable a wider cross-section of the population to make use of this developing technology. This would help to address the social concern relating to the division of the society into those who can afford access to the rich communication sources of the superhighway and those who cannot.

They could also provide facilities to meet telecommuting needs—see below.

WORKING PRACTICES (QUESTION 7)

The development of the information superhighway can have important ramifications on the evolution of working practices. It will be possible for many people to perform at least a part of their work remote from the workplace that they routinely attend today. This can have enormous impact in the need for expansion in the physical transport infrastructure which is very expensive—much more so than the cost of a high bandwidth communications infrastructure—and environmentally damaging.

The realisation of this potential could be speeded up by such actions as:

- incentives for individuals to use a part of their home for remote working
- for people who do not have the space, the provision of local telecommuting centres removing the need for a long commute. Such centres could be a regular feature of all suburbs and villages.

GENERAL OBSERVATIONS

There has been a considerable amount of study and discussion on this topic over the last year and there is a growing body of expertise in the area. There have been some detailed reports published which should be considered (see references 6 and 7). In addition many professional societies have specialist groups with expertise relevant to various aspects of the subject, for example the British Computer Society group looking at legal aspects of IT. These groups could provide more detail on almost all the topics addressed above.

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4. http://www.meto.govt.uk
5. http://www.itl.net/barclaysquare
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Memorandum by the British Standards Institution

1. I am responding to your letter of 19 December 1995 addressed to Sir Neville Purvis, KCB, Chief Executive of the British Standards Institution.

2. On his behalf, I wish to thank you for inviting BSI to submit written evidence to this Sub-Committee.

3. This evidence addresses those aspects of questions, 1, 3 and 8 which involve standards relating to the Information Superhighway.

4. DISC is responsible within BSI for Delivering Information Solutions to Customers through international standardisation, with the mission "to help enterprises achieve their operational efficiency by acclerating standardisation and by promoting standards and making them easy to exploit".

5. DISC members, drawn almost exclusively from industry and commerce, with representatives from government bodies, professional institutions, public and private utilities, research bodies and a few select academic experts, are involved in the development of standards for all aspects of information systems and communications. The principal focus for these developments in information systems is international; once published, then it is policy that these standards be harmonised across Europe. In communications, the principal focus is European, with the same policy of harmonisation. In only those cases for which separate national standards are necessary, often for regulatory purpose, do we deviate from these objectives.

6. The national contributions to international and European standardisation are made to ISO, IEC, ITU, CEN, CENELEC and ETSI (see para 14 below for full titles).

7. In addition to the development of formal standards, DISC is active in the promotion of standards and publishes management guides, codes of practice, newsletters and organises events targeted at informing a wider audience and, usually through our members, contribute to international and European seminars such as the International Seminar on Standards Aspects of the Global Information Infrastructure (GII) scheduled to take place in Geneva on 24–26 January 1996. DISC also works with the developers of informal standards, industry consortia and other bodies, which are able to achieve agreement on technical specifications in a shorter time than is possible for formal standards, for which the onus of consultation and wide consensus is required.

8. With this backdrop describing DISC's, and BSI's, qualifications for submitting this evidence, the following paragraphs will address the standards issues raised in the Call for Evidence.

9. *What is the current form of the "Information Superhighway", and how is it developing (i) in the United Kingdom and (ii) worldwide? What specific problems arise from the incompatible network standards and why are these incompatibilities arising?*

1. There are others far better qualified to answer the first of these questions. For the purposes of the following evidence, it is sufficient to consider the Superhighway as a term that describes the communications networks and their interconnection gateways, by which different computers around the world can communicate with each other for the exchange of information.

2. With regard to network standards, there are essentially two sets of standards in use which are associated with the transfer and processing of messages on the Superhighway.

3. The most common standard, originally developed in the United States, is the Internet; this is not in fact a formal standard, but is a large set of specifications developed by a consortium approach and now managed by the Internet Engineering Task Force.

4. Formally agreed standards for message transfer and processing do exist, developed within ISO and IEC, of which the X400 standard is the one most often quoted, but there are in fact a number of individual standards which apply; these standards are used rather more within Europe than in the United States, but their market penetration is considerably less than that of the Internet specifications.

5. Hardware and software products conforming more or less to each of these standards are available worldwide and it is these which provide the infrastructure used by organisations to access the Superhighway and to inter-communicate.

6. Since in any installation, the combination of computer hardware and software, a number of these products must work together in order for it to work correctly, there is considerable scope for assembling a computer system which works poorly, or even not at all, in its access to the Superhighway communications infrastructure, especially where both sets of standards are involved. This is especially a risk for an organisation installing a connection to the Superhighway, but there can be problems also concerning the transfer of messages across the gateways between any two networks; it is usual for any message to cross such gateways unless the two correspondents are supported by the same service provider.

7. Since there is as yet no convergence between these two sets of standards, there are flourishing communities of well-intentioned individuals and small companies who develop software that solves specific communication problems, particularly related to the Internet set of specifications, and who supply such software solutions to anyone who wants them with either a minimal or no charge, but without accepting any liability for functionality, integrity or consequences for its use; this is known as freeware or shareware. It is often necessary to use such shareware, with its attendant risks, in order to send information in electronic form over the Superhighway.

8. The Internet Society and the ISO/IEC committees developing these standards have come together within a formal agreement to develop convergence between the sets of standards. It will be some years before this convergence is truly achieved.

10. *Who will supply these services to consumers in the United Kingdom? How can the participating companies be categorised and what is the nature of the commercial relationships between them? How are suppliers likely to develop? What service standards exist and how are they likely to evolve?*

1. There are others who are better qualified to answer the first three of these questions.

2. While there are service agreements in operation, written by the service providers and usually non-negotiable except in the cases of large user organisations, BSI is not aware of the existence of any common standards for the provision of these services.

3. BSI members, in common with others within Europe, are starting to develop service standards in a number of business sectors, but these are tending to concentrate upon those sectors where the trading relationships are well established and follow common guidelines. In addition to the development of standards for specific sectors (eg Removals—France), generic standards are being implemented that can be applied to a wide range of contacts or activities (eg Complaints Handling—Australia). Standards in this latter category may find an early application in this area.

4. In the volatile and fast-moving world associated with the Information Superhighway, one would not expect the development of such service standards to be high among the priorities of the service providers.

5. However, the existence of service standards would be in the interest of the consumers; this would require there to be an undisputed consumer consensus or, alternatively, legislation in order for such service standards to carry any degree of observance by the service providers.

11. *Is the dominance of mass-market US software a threat or an opportunity? What hard commercial initiatives can be made (as opposed to "collaborative" ventures such as RACE or ESPRIT) to respond to this dominance?*

1. With regard to the second question, US organisations appear to be dominant in most aspects of the Superhighway. However, DISC is already taking an initiative to recruit UK members to the World Wide Web Consortium (European Branch) which was formed during 1995 with a predominantly French membership. This consortium, originally formed in the United States, but now wishing to become more international in its base, is developing informal standards for the World Wide Web. It is DISC's belief that the United Kingdom will be disadvantaged unless UK organisations take an active part in this consortium and, although not within the conventionally perceived preserve of a formal standards body, DISC's wider remit places it in a position in which such an initiative can, and should, be taken.

12. This concludes those aspects of your Call for Evidence for which BSI has appropriate responsibilities.

13. BSI will be pleased to give oral evidence to the Sub-Committee if this should be invited.

14. The acronyms of the standards bodies are:

— ISO	International Organisation for Standardisation
— IEC	International Electrotechnical Commission
— ITU	International Telecommunications Union
— CEN	European Committee for Standardisation
— CENELEC	European Committee for Electrotechnical Standardisation
— ETSI	European Telecommunications Standardisation Institute

Dr D K Potter
Chief Executive—DISC

18 January 1996

Memorandum by Cable and Wireless plc

INTERCONNECTION, STANDARDS AND REGULATORY REFORM

Three features, at national and international level, are essential to the optimum deployment of the information infrastructure needed by the information society. One is the seamless interconnection of the discrete national networks that will form in the information superhighway, another is the requirement that the services and applications that will be carried over this global information infrastructure should be able to work together. The third involves a radical rethink of the existing regulatory framework.

There is a multiplicity of telecommunication network interconnection requirements and configurations, reflecting the diversity of networks and their supporting technologies: mobile to fixed to specialised satellite to paging; international to national to local; circuit switched to packet switched to frame relay. In the future many of these networks and technologies will become the interconnected local adjuncts to an ATM-driven superhighway backbone.

The benefit to the citizen of such interconnectivity and all that it implies for his or her future education, health and prosperity is most probably critical. Citizen's rights of access to networks, where they exist at all, are obscurely defined. Network operators' rights of access to each others' networks are underdeveloped. This must change if optimum human and technological potential is to be realised. Indeed, access to the global information infrastructure may well require to become a 21st century human right.

Regional and local inititatives continue to evolve to secure transparent and nondiscriminatory access to networks and services by consumers and other operators. These initiatives can perhaps be best described as nonstructural safeguards. In Europe they are represented by the Open Network Provisions (ONP) of the European Commission. In America the FCC's Open Network Architecture safeguards envisage user and enhanced service provider interconnection to basic network functions on an unbundled and equal access basis. Some jurisdictions in the USA have a vision more far-reaching than the original FCC view and see the ultimate objective of ONA as creating an environment in which all users can create their own services or networks using, where necessary or desirable, the functional elements of the underlying transport network. This vision seems in tune with the technological potential of an ATM-driven information superhighway where distributed processing will provide increasing customer empowerment as intelligence moves from the network to the customer terminal.

Open systems standards will also play an essential role in creating a transparent global infrastructure and require regional standards bodies to co-operate in defining unified standards to secure ubiquitous interconnectivity. National and regional standards-making in telecommunications and broadcasting is an industrial reality having its roots in commercial and cultural imperatives. Harmonisation efforts in international fora such as the ITU and ISO need to focus on the establishment of open interfaces in various networks and computing systems in order that vendors do not lock operators and users into proprietary systems. A computer system consists of hardware, the operating system, and the applications which will run on a wide range of platforms. For communication between applications international standards can define

Application Programming Interfaces (APIs) for software portability and define communication support tools.

The standards making process needs to develop framework architecture in a way that pays increasing recognition to the convergence of telecommunications technology, computing platforms and multimedia services.

For the telecommunication highway to act as a universal information infrastructure with any company providing any service to any customer there needs to be a radical rethink of the regulatory framework. Without such a rethink the transformation in the telecommunications environment now feasible and vital for the regeneration of the commercial and social fabric of mature OECD economies will be delayed or introduced in patchy, suboptimal ways.

The interest of society at large for broadband access is greater than the narrow interest of a carrier or a set of carriers to maximise profits by bottlenecking such access, as has been the tradition in the era of narrowband networks and scarce availability of capacity in transmission, switching and terminal equipment.

There are no physical or technical reasons why communication transmission lines cannot act as electronic highways. But so far telecommunications operators have maintained exclusive control of their networks and have used them as tools to expand their influence and control over their customers' communications habits. The customer has no free access to the network and the terms and conditions of such access are strictly regulated by the carrier.

Compare and contrast the roadways where everyone from a hitch-hiker to a nuclear fuel carrier has free access and can bring on any shape and size of vehicle and determine the routing. All parts of society traverse the road system for all sorts of purposes—business, leisure, educational, health, security. The broadband system, once in place, is supposed to address precisely the same parts of society as they pursue precisely the same purposes.

In the broadband environment the wire to the home will provide each customer with abundant capacity. The customer will not need more than one broadband pipe, what he or she will want is least cost access to a menu of services and not only the services provided by the provider of the broadband pipe. The owner of the pipe should welcome any service provider who will be helping fill the pipe.

Structural separation of service provision from the ownership and operation of the underlying infrastructure may be necessary. Non-structural safeguards may be an insufficient measure to address the conflict of interests that vertically integrated operators face when opening their networks to competitors.

The Internet is hugely successful precisely because the service providers are structurally separated from the network providers and the customer enjoys least cost access to these services.

Today's copper wires are underutilised. In tomorrow's world of superabundance a new regulatory model therefore will be needed which encourages ease of access, at near zero cost, to the highway infrastructure by all the parties—network competitors, large and small users and all forms of service providers. The structural separation of the underlying infrastructure from service provider and services addresses this by removing the traditional dominant vertically-integrated bottleneck access to the network—allowing unencumbered creation of new services, products and players.

Indeed, the importance of creating a new regulatory order facilitating least cost access to the broadband networks of tomorrow for all parties irrespective of ownership becomes critical if we consider the effects of near-zero tariff telecommunications, reflecting near zero unit costs, the outcome of the current microelectronic and fibre optic revolutions.

Cable and Wireless commissioned a major study on this subject from Simon Forge of the Cambridge Strategic Management Group on this subject in 1994. An Executive study is attached in Annex A *(not printed)*.

Memorandum by the CCTA

SUMMARY

CCTA, the Government Centre for Information System is responsible for stimulating and promoting the effective use of Information Systems in support of the efficient delivery of business objectives and improved quality of services by the public sector. CCTA is part of the Office of Public Service (OPS) in the Cabinet Office.

CCTA's work on the Information Superhighway is ensuring that central government is at the forefront in the development of the Information Society by enabling electronic access to government information and services.

CCTA is utilising the Superhighway to maximise universal access to Government information. CCTA's Government Information Service has shown a spectacular rise in usage from its inception 15 months ago to over 200,000 accesses per week currently.

CCTA is providing the whole of the public sector with economical access to the Internet using the existing Government Telecommunications Network.

CCTA is also taking part in a number of collaborative ventures with organisations such as Buckingham Palace, both Houses of Parliament and central and local government to improve access to government information using the Information Superhighway. These include:

— *Democracy in Britain:* a multi-media application which shows how the democratic process works in Britain.

— *Public Access Kiosks:* on-line information is already available at local government sites and work is in progress on kiosks for central government and for the Palace of Westminster.

— *Whitehall 2000—The Top of the Office of the Future:* A look into the future. A demonstration of how Ministers and senior government officials can be aided by emerging technologies.

CCTA won several accolades for its CCTA Government Information Service (CGIS) during 1995, including "Computing" magazine's Internet Users of the Year Award 1995.

THE CCTA RESPONSE

The Sub-Committee has invited written submissions of matters of relevance to *Information Superhighway: Applications in Society* and has put forward a list of questions to answer.

CCTA, the Government Centre for Information Systems is responsible for stimulating and promoting the effective use of Information Systems in support of the efficient delivery of business objectives and improved quality of services by the public sector; we have therefore concentrated our response on the areas most appropriate to this role.

CCTA is responding to the following questions:

5. What is the role of central governments in connection with the Information Superhighway service provision including the following areas:
   (i) leadership
   (v) access to government information.
7. What will be the impact of the Information Superhighway on working practices and employment prospects?

CCTA feels that it is not appropriate to respond to questions 1–4 inclusive, question 5 sections ii, iii, iv, vi, vii, viii, ix, questions 6 and 8. However, our response to 5(v) is relevant to 2(i), *What services are being provided for public information?*

INTRODUCTION TO CCTA

CCTA, the Government Centre for Information Systems is responsible for stimulating and promoting the effective use of Information Systems in support of the efficient delivery of business objectives and improved quality of services by the public sector.

CCTA is part of the Office of Public Service (OPS) in the Cabinet office. Its aims are to maintain an impartial centre of expertise on Information Systems (IS) within government:

— to contribute to the formulation of policies developed by the centre of government, in which IS/IT systems have a supporting function

— to achieve acceptance of best practice for the acquisition, management and use of IS/IT by the public sector to help raise the standard of services it purchases and provides and to improve overall efficiency and effectiveness.

— to provide the public sector with advice and support to underpin CCTA's best practice guidance on IS/IT for business applications and central policy requirements.

QUESTION 5

The role of central government in connection with the Information Superhighway service provisions

(i) leadership

DTI have primary responsibility for the development of the Information Superhighway in the UK. However, CCTA feels that in many of the examples detailed in our answers to Question 5 (v) CCTA is demonstrating innovative and ground-breaking ways of using the Superhighway.

(v) Access to government information

CCTA has taken a lead in support of "open government" by providing two Information Superhighway services—GTNET and CCTA's Government Information Service for use by the central government, public sector and by the public at large. CCTA is also co-ordinating jointly with the Treasury Board of Canada, the G7 Government On-line Project.

CCTA Government Information Service (CGIS)

CCTA provides the CCTA Government Information Service. This is an on-line service giving access to government information via the Internet. The service currently provides information from 120 public sector bodies and 60 government departments and agencies. The information provided includes ministerial speeches, press notices and statistical data as well as more general information about the various organisations' services. Since inception in November 1994 the CGIS service has been accessed over six million times, about 200,000 times per week with 60 per cent of these accesses from Europe and the UK. A key objective of the service is to provide users with a single on-line point of entry to public sector information using simple search techniques.

CCTA won several accolades for its Government Information Service during 1995:

- the Internet Users of the Year Award 1995, presented by Computing Magazine
- one of the top 5 per cent Internet sites awarded by Point Communications Corporation of USA
- the Independent newspaper placed CGIS in the top five best government sites in the world, the others were all American.

GTNET

GTNET is CCTA'S Internet Access service which is provided to government organisations over the Government Telecommunications Network (GTN). The aims of GTNET are to:

- give government organisations low cost access to the Internet
- provide electronic mail (e-mail) for GTNET users between each other and with the rest of the world
- help government organisations to obtain experience of the Internet that will allow them to provide feedback on the design, implementation and management of the next generation of Information Superhighways and their application by government.

Collaborative Open Groups (COGS)

Collaborative Open Groups have been set up by CCTA to stimulate discussion of significant issues concerning the Information Superhighway and its use by government. Their purpose is to generate ideas and synthesise opinions to form a contribution from users to the consideration of policy options. Currently there are over 1,300 subscribers to the COGS. There are 16 COGS covering issues including:

- legal issues
- education
- electronic commerce
- ethics
- local authorities
- security
- the building of public access "on-line" information systems
- Europe.

Details and reports of all the COGs can be found in the CCTA Report on Information Superhighways.

Guidance to government departments

CCTA has published several documents in paper and electronic form about the Information Superhighway and the Internet as part of its responsibilities to help government departments make best use of information systems. These include the following:

- *Making the best use of the Internet*

  This addresses practical issues concerned with the use of the Internet, and provides organisations with tips and hints on how to make best use of the Internet
- *CCTA Reports on Information Superhighways 1995*

  This looks at how the UK government is exploiting Information Superhighways and sets out a vision for improving services to the citizen and enhancing UK competitiveness

— *Writing for the Web*

Guidelines to assist government departments in producing a well designed and consistent user interface to the information that they make available on the Internet.

Future guidance includes a substantial piece of work on legal issues related to the Internet.

G7 GOVERNMENT ON-LINE PROJECT

CCTA is co-ordinating jointly with the Treasury Board of Canada, the G7 Government On-line Project. The project is intended to improve public services through the use of on-line systems and has three main themes:

- the increased use of electronic mail for communications with and within government;
- the provision to the public of on-line services;
- the development of on-line transaction processing services for more complex transactions.

The principal objective of the project is to increase significantly the amount of government business that is conducted electronically.

There are two fundamental common business activities which underpin government. These are communication, ie exchange of information, and transaction processing. Currently these activities are largely paper-based within government, but supported by a variety of information systems. By changing to on-line information exchange, the use of paper can be made the exception rather than the norm.

The project is pooling knowledge and resources through information sharing and collaborative projects where countries will work together to develop methods, policies or applications.

COLLABORATIVE VENTURES

Public access to information

Democracy in Britain: a multi-media application which describes how the democratic process works in Britain. It includes information on Parliament and how it relates to Whitehall and the Monarchy. It has information on both central and local government as well as a European dimension. The application also describes the role of the citizen in the democratic process.

Public Access Kiosks: Self-service kiosks enable access to information at a time and place convenient to the citizen and are an excellent means for maximising access to government information.

CCTA, in partnership with IBM, the Benefits Agency and several local authorities, has developed a kiosk to enable the public to obtain information from computer terminals located in public places. The latest version of this allows access to the Internet. We are using the kiosks to raise awareness in both public and private sectors of the potential for such applications, and to encourage and assist organisations wishing to provide Internet accesss in public places.

Whitehall 2000—The Top of the Office of the Future: A look into the future. A demonstration, bringing together many of the exciting emerging information technologies and anticipating those which are still on the drawing board. A view of how Ministers and senior government officials can be aided by information technology to meet the demands of their duties whilst in the office, travelling on business and at home.

CCTA is also working with the Palace of Westminster to provide information about the Palace to the public via kiosks.

QUESTION 7

The Impact of the Information Superhighway on working practices and employment prospects

Employment

The current US administration's view is that:

> *Information is one of the nation's most critical economic resources. Estimates are that two thirds of US workers are in information-related jobs and the rest are in industries that rely heavily on information.*

It is not unreasonable to assume that this estimate could apply to Britain. In which case the Information Superhighway, which provides the means of accessing and transmitting much of this information, becomes vital.

Information, after people, is the most important resource of any organisation, public or private. The information needs to be sifted, sorted and presented in a manner that is acceptable to the customer. This will call for a skilled workforce that are information literate; that is, they know what information is required where and how to get it and how it should be presented to each customer.

The Information Superhighway is key to delivering electronic government that will soon operate in ways that the most visionary planner could not have imagined five years ago.

Conducting government business electronically

The Information Superhighway is increasing the ability of government to carry out its business electronically, with the subsequent reduction in the burden on the private sector in its dealings with the government. Some of the major applications and benefits are listed below:

- timely provision of information on demand
- reduced paper handling
- easier update of forms
- easier and improved access to and between government departments, by the use of desktop video conferencing, e-mail and the publication of e-mail addresses.

Speed

Forms, memos, minutes and submissions can all be dealt with more quickly if they are submitted and replied to on-line. Written communications to a government department can be dealt with far more efficiently when received electronically, eg an automatic response to routine enquiries.

24-hour access

The advent of services such as 24-hour telephone banking have increased the public's expectations of service. The Information Superhighway offers a gateway to information and advice on-line at any time of the day. Frequently asked questions can be answered automatically, those that need intervention from an official can be logged and the question e-mailed to the relevant organisation with the promise of a response within a prescribed time.

Disappearance of the 9 to 5 working day

Facilitating access by clients to government officials over the Superhighway at any time also facilitates the response by that official at any time. Routine work could be carried out remotely and at any time by officials.

Public access terminals

The public sector is charged with improving its internal efficiency and the services it provides to the citizen. Public sector organisations must ensure that they treat customers equally and without bias. Appropriate use of self-service kiosks can help to achieve both these goals. Kiosks enable those who can help themselves to access government information and services to do so. This allows resources to be redeployed and refocused on less routine queries and on improving service. Terminals in public places such as local government offices, central government offices, libraries, tourist attractions and shopping malls can provide, and in some cases are providing, information to the public about local and national services.

Memorandum by Christian Action Research and Education (CARE)

CARE has noted that the Select Committee is undertaking an investigation into the information superhighway. I am enclosing a copy of CARE's report on *Ethical Issues and the Internet* for the Committee's information.

CARE (Christian Action Research and Education) is a charity specialising in research and education on issues affecting family life and especially children. It has been involved in assessing the impact of the media on society for over 20 years.

Through its separate non charitable lobbying arm, CARE Campaigns, CARE has sought changes to legislation affecting broadcasting and other media. In the last two and a half years we have given evidence to the House of Commons' Home Affairs Select Committee in their investigations into computer pornography, and violent videos and young offenders.

I am sure that you are aware that the Government Centre for Information Systems, the CCTA, is conducting a study into ethical issues related to the use of information superhighways, and the Internet, in particular. Last year, CARE was asked to contribute to this study after our previous work on computer pornography. I hope the Committee will find our report of some interest.

ETHICAL ISSUES AND THE INTERNET

1. Summary and Conclusions

1.1 The Internet has developed over the last 20 years from a communications system within the academic and government community to a world wide public information system, with access in businesses, schools and homes.

1.2 The Internet is part of the change in media communications that is developing on the road to the full "information superhighway". The international nature of the Internet and wide public access to all the information raises issues that will become even more prominent as the information superhighway develops.

1.3 All previous new media/technological developments have been accompanied by a review of the environment in which they operate to protect individuals and provide a sensible framework for development, for instance, agreeing to a code of practice.

1.4 Current UK media laws can in the main be applied to the content of the Internet. The major deficiency in applying the law to the Internet is the definition of importing a tangible item in relation to computer data.

1.5 We recommend that there should be voluntary international action on the content of the material on the Internet based around a code of practice supported by service providers, and monitored by an international organisation with a similar approach to the UK based Independent Committee for the Supervision of Standards of Telephone Information Services (ICSTIS). We urge the UK Government to take a leading role in this development.

1.6 There are other ethical issues that need to be considered in depth by the appropriate specialists, such as intellectual property rights, data protection and libel, for the Internet to reach its full potential within the business community.

1.7 Immediate action needs to be taken against threatening e-mail, the existence of child pornography (both pictures and text) and against sexually violent material being distributed on the Internet. There is currently a lack of resources being devoted to enforcement on these matters.

2. Introduction to CARE

2.1 CARE (Christian Action Research and Education) is a charity specialising in research and education on issues affecting family life and especially children. It has been involved in assessing the impact of the media on society for over 20 years.

2.2 Through its separate non charitable lobbying arm, CARE Campaigns, CARE has sought changes to legislation affecting broadcasting and other media. In particular, we have been involved with the Protection of Children Act 1978, the Indecent Displays (Control) Act 1981, the Local Government (Miscellaneous Provisions) Act 1982, the Video Recordings Act 1984, the Broadcasting Act 1990 and several Parliamentary attempts to reform the 1959 Obscene Publications Act.

2.3 In the last 18 months we have given evidence to the Home Affairs Select Committee's investigations into computer pornography, and violent videos and young offenders.

2.4 CARE has been connected to CompuServe for several years and has got full access to the Internet[1] through Cityscape.

3. The Information Superhighway: An Opportunity not to be Missed

3.1 CARE welcomes the opportunity to contribute to this important discussion at a time of rapid change in international communications. In the past 20 years the Internet has grown from an obscure network connecting academics and government in the USA to an essential source of information and communication medium for 30-40 million people worldwide.

3.2 The Internet is giving us a foretaste of future changes in communication. The "information superhighway"[2] will clearly have many benefits to bring to our society, and we wish to see these maximised in our schools, homes, government and business institutions.

3.3 Recently, the G7 held a special meeting to consider the "information society" and we take note of the conclusions that there needs to be a commitment to:

- promote universal service to ensure opportunities for all to participate;
- serve cultural enrichment for all citizens through diversity of content;
- pursue adequate education and training;
- improve the understanding of effects on the quality of life;

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[1] A global network of computers connecting an estimated 30-40 million users together around the world, providing a variety of services, eg usenet news, www, ftp and email.

[2] An information system capable of carrying vast quantities of information at high speed, with the capacity for two-way interactive communication and capable of carrying any media, eg text, video, audio and images.

— encourage the dialogue on worldwide cooperation.[3]

3.4 We recognise that the new information society will consist of far more than just the Internet, but we consider it in this document as a microcosm of what will be available in the next few decades, as there is convergence of computer and video technology which will allow facilities such as home banking and shopping.[4] However, as access to the Internet increases internationally and becomes widely available in individual homes, many of the ethical issues that need to be considered about the use of the full "information superhighway", begin to arise. We welcome the commitment by the G7 to monitor the social and societal implications of the information society.[5]

3.5 Thus in considering ethical issues related to the Internet we are not concerned merely with a narrow discussion between existing academic users about censorship and freedom. Rather we are setting a pattern for how major societies internationally are going to deal with international communication available in individual's homes which they will have the opportunity not just to see but to participate in. It is the international and interactive nature which raises some new questions.

3.6 When any new communication medium emerges there are often debates about appropriate forms of good practice, acceptable content, impact on those with access to it, especially children, and whether existing mechanisms provide adequate regulation to prevent abuse. Relevant examples are changes in broadcasting to allow satellite and cable in the UK and the privatisation of British Telecom. In both of these situations the Government recognised that they had a role in establishing the boundaries of the environment within which the medium would operate. We believe the Internet and the Information Superhighway are no different in that respect.

3.7 We recognise that the Government has to consider many different issues when considering future policy on the information superhighway to maximise the benefits for Britain. We do not feel that it is our place to comment on the Government's competition policy. However, we do believe that our experience over the years, gives us a clear perspective on some of the ethical issues that we consider the Government should be reviewing and dove-tailing in with other policy decisions. We fully support the Prime Minister's initiative to set up an inter-departmental working group on obscenity, concentrating on the trends in computer and child pornography.[6] We hope that the work of the CCTA in this area will feed into the new group.

3.8 We also recognise that the press seem at times to have concentrated largely on the more unsavoury side of the Internet, and ignored most of the potential benefits. This has understandably drawn a negative reaction from the Internet community, who have vigorously defended the position of free speech and access to material, whatever its contents.

3.9 In this report, we consider ethical issues associated with the Internet, including free speech and censorship, look at how current UK legislation can be applied to the Internet, and respond to the discussion that has taken place in the ethics collaborative open group (COG) initiated by CCTA.[7]

4. The Issues of Censorship and Free Speech

4.1 The Internet has developed in an academic environment which has, naturally, jealously guarded its academic freedoms. We can understand why concerns about free speech should be considered so important in such an environment. However, it is clear that the Internet is no longer operating solely within these boundaries, and that wide public access is now the target audience. Therefore, some of the principles of operation may need amending to provide adequate safeguards in this wider context.

4.2 A major concern within the CCTA ethics COG has been the issue of free speech and a possible change in the regulatory framework within which the Internet operates, which might squash this. It has been suggested that discussion on the Internet is like a form of public conversation, which is successfully policing and regulating itself. For example, it is argued that just as we would not accept racist comments within our general conversation, we would not allow the same sentiments to be expressed on the Internet, ie individuals who step outside "netiquette" would get "flamed" by other users. There is a considerable part of the Internet community who agree with this view and argue that "if it's not broke don't fix it".

4.3 While we do see benefits to the current mode of operation, we are concerned that there is a sector of the material on the Internet which is causing concern amongst the general public, and potential new users, not only because of its existence, but also because of its availability to all who access the Internet. Furthermore, we believe that the Internet cannot simply be viewed as a form of public conversation, because of the diversity of the material available and its increasingly wide accessibility. Users need to recognise that the Internet is a public forum, and behave accordingly.

4.4 While the concept of "censorship" conjures up many negative impressions, we believe that the principles underlying the concept are, and always have been, society's way of putting the boundaries of acceptability on material and behaviour: we need to draw the line somewhere. For instance, our laws currently draw the lines of acceptability at propagating racist material: we say that this is illegal. We draw the line at acceptability of actions in other laws, for instance, no murder, no rape, no stealing. Those who oppose "censorship" argue that the principle of censorship is a reduction in freedom of choice. This is a truism, but we suggest that we are daily facing decisions as to where to draw the line. Do those who argue for free speech agree that pornographic pictures of children should be widely available? It might be their child. Do they agree that fantasy stories telling tales of sexual violence against women should be easily available to teenagers? Or that the Internet should be used to threaten individuals by the distribution of racist material? We believe the argument that is facing the Internet community (of which we are part) is where the line should be drawn, what restrictions are sensible, and how the debate about these issues is conducted.

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[3] Chair's Conclusions, G7 Information Society Conference 25-26 February 1995, p3.

[4] We would expect to see other types of media, eg video conferencing and real-time movies, on a true "information superhighway".

[5] *Ibid*, p2.

[6] *Official Report*, 28 March 1995, c.546.

[7] An Internet "listserv" discussion group that has debated some of the ethical issues surrounding the Internet, initiated by Robert Hughes MP, and run by the CCTA at ethics@ccta.gov.uk.

Free Speech

4.5 One of the strongest views expressed about the Internet is that it is vital for freedom of expression. While we accept that it does provide an opportunity for those who are persecuted to find a neutral forum (see our comments on anoymous e-mail in the Appendix), we do not believe that the abuse of women and children portrayed in pornographic or racist material is "freedom of expression" for these particular individuals.

The Issue of Encryption

4.6 The Internet offers wide public access to vast quantities of information of all different types. Some of this information is "encrypted", that it is "scrambled" to limit its availability only to those who the "key" to the code. Businesses use encryption for the transfer of commercially sensitive material. Others use it to keep individual pieces of information private, eg a personal e-mail.

4.7 We believe that if the Internet is to be commercially viable, businesses need to know the information they send via the Internet, or publish on the Internet will be secure. This security has to cover the possibility of potential hackers, intellectual property rights and data protection issues. CARE does not have the expertise to comment in any depth on the latter two points, but raises them with the Government as areas for further consideration by the appropriate specialists. Clearly encryption is one way of protecting data.

4.8 Encryption might also be used to limit access to pornographic or violent material unsuitable for children. However, we are concerned that encryption could be used to hide illegal material from public view. Encryption does not make illegal material legal. We therefore believe that the police should be able to investigate cases where encrypted material is suspected to be of an illegal nature.

Pornography on the Internet

4.9 We have received letters and calls from amongst our supporters who are very concerned about the propagation of pornographic material. We therefore cannot agree with a view from the ethics COG that "no-one on the net cares that much about pornography", or that pornography is "essentially sad rather than threatening".[8] In most cases, child pornography is a visual record of child abuse. In many countries it is illegal. It can be used to persuade other children that sexual intercourse with adults is perfectly natural.

4.10 CARE accepts that some of the pornography on the Net is copied from other sources (eg magazines), and not being put there commercially by pornographers. However, the fact that both *Playboy* and *Penthouse* have their own world wide web pages indicates that the Internet is seen as a potential new market, which will be fully exploited when commercial transactions can take place on the Net. In addition, pornographic material on the Internet may encourage individuals to purchase other forms of pornography, eg magazines or videos.

4.11 One contributor to the COG suggested that one of the big growth areas on the Internet over the next few years would be pornography services. A pornography server containing pictures, etc could be set up in a country where the material was legal. Purchasers would pay for the material by electronic money transfer, and the material would be e-mailed in an encrypted form, which would ensure that only the intended recipient could decode it. CARE can also foresee that such a situation would arise, and agrees that pornography would be able to continue its multi-million pound status under these circumstances, because after initial start-up costs, the running costs are low. However, we can not agree with the final sentiments of the contributor: "It is equally likely that politicians will want to try to stop it. They must then decide what they prefer: pornography, or poverty." We believe that a system with secure access and free from material like child pornography will be far more attractive to businesses, who will be carrying the Internet into the next century. Scott McNealy, president and chief executive of Sun Microsystems, recently said:

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[8] For studies on the effects of pornography we suggest referring to Edward Donnerstein, Pornography and Sexual Violence, 1988, Dolf Zillmann & Jennings Bryant, University of Indiana, Symposium on Media Violence & Pornography, (Toronto, 1984), Final Report of the Attorney General's Commission on Pornography, (Rutledge Press 1986), & Itzin, Women, Violence & Civil Liberties, (OUP 1992).

> *". . . commerce will come to the information superhighway only when its sees this as an opportunity . . . there are two obvious [problems]. Firstly, business needs a well-managed network infrastructure. Secondly, it wants as secure an environment as possible."*[9]

The Argument if You Don't Like It Don't Look At It

4.12 There is some agreement that children should be protected from pornographic material on the Internet, but disagreement on how material should be available for adults. The advice to those who do not wish to view any such material is brief and to the point, consisting of advice like:

— avoid alt.sex.* hierarchies altogether;

— scan the "content codes" in the subject heading, or set a local kill file to eliminate unsavoury stories;

— if you see a story/picture you do not like, skip it and go on to the next one.

4.13 While some of this may appear sensible advice, we believe the existence of the alt.sex groups is so obvious (eg alt.sex.pedophilia, alt.sex.bondage), that it can be compared to seeing pornographic material on the sweet counter. Magazines on the top shelf of newsagents are purposely put away from eye level, and cannot be purchased in privacy. The alt.sex groups are immediately "visible", with a suitable newsreader, and are available to look at without anyone else knowing.

4.14 We suggest that it would be appropriate to introduce a system equivalent to call barring on the Internet to filter out the alt.sex groups. Any telephone user wishing to be able to dial the adult sex lines, has to "opt-in" to these numbers and use a PIN to do so. We would like to see a similar facility for Internet users, and believe this would be reassuring for parents and particularly appropriate in schools. (See also our comments on child safe access in the Appendix.)

4.15 Of course, any such restrictions should not confer acceptability or protect illegal material like child pornography.

Application of Current Laws to the Internet

4.16 There has also been a view in the ethics COG that current laws of censorship are not generally accepted by the majority of the population, and are therefore doing more harm than good. In the next section, we discuss how current laws and regulatory systems are applicable to the Internet. We urge the Government to propagate this information, and consider adequate enforcement that does not undermine the legal position. If individuals or groups are still not satisfied by the regulatory framework of the Internet, we encourage them to use the democratic processes to lobby Parliament and the Government to bring about change. In the meantime, we consider threats of individuals causing havoc by hacking into government computer systems if "censorship is imposed on the Internet" for what it is: blackmail.

5. The Internet: Different yet the same

5.1 We believe that any consideration of if and how the Internet should be regulated needs to be guided by how other types of media are regulated and how these are similar to, or different from, the Internet. In looking at these media, it is the principles of regulation, that are critical to any application to the Internet, rather than the minutiae of the law, and the mechanics of implementation.

5.2 The Internet is made up of computers connected together mainly by telephone lines. So, it is logical to consider how these existing technologies are regulated. Then we need to look at the sort of material that is available on the Internet, as it brings together many different forms of media onto one platform. Consequently, we suggest that the written material on the Internet is analogous to books and magazines, still pictures are also comparable to books and magazines, and moving pictures can be compared to videos. All of these media are recognised in law, and their content is already regulated.

Why is there regulation of other media?

5.3 CARE believes that the legal system is in place to protect people from one another and from harmful influences. The purpose of our laws is not only to discipline individuals who transgress these laws, but also to discourage other people from doing the same thing, and make a statement about society's view on a particular matter. Over the years, there has been public agreement, expressed through Parliament, that this sort of protection should be in place for all forms of media. We would argue that there have to be exceptional circumstances which would mean that the Internet should, in principle, be exempt from any kind of regulation.

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[9] *Financial Times*, 3 May 1995, p 2 of Review.

5.4 There has been some discussion on how the Internet can be regulated when the laws of different countries in which users are operating differ. We suggest that UK citizens have to operate within the legal framework of the UK, and that the laws of other countries should not impact what UK nationals post or publish on the Internet.

A comparison with other forms of media

(a) *The telephone*

5.5 An obvious starting point for comparison is within the telephone. Conventionally, we have understood the telephone to be an instrument where one individual speaks to another individual via a telephone transceiver and a telephone line. Many businesses do have the facilities to have "conference calls" where one individual calls and is listened to by several others, but generally telephone messages are a 1:1 form of communication.

5.6 We do not believe that the telephone is an instrument of totally unregulated "free speech". Clearly, one can say what one likes to whoever one is speaking, even "hang up" at the end of a row, but, one cannot make obscene or threatening telephone calls without fear of official sanctions. Making obscene or threatening telephone calls is prosecutable under section 43 of the Telecommunications Act 1984 and subject to a penalty of £2,500. Racist, sexist and sexually harassing phone calls falls into this category.

5.7 With the privatisation of British Telecom (BT) in 1984, a number of innovative new telephone services developed. However, shortly after these premium rate telephone services became available, BT realised there were concerns about the services which were being provided and the content of some of the material. In response to these concerns, BT became a driving force in the formation of the industry watch dog, the Independent Committee for the Supervision of Standards of Telephone Information Services (ICSTIS). By doing this, BT preserved its good name.

5.8 Premium rate services now provide telephone users with specialist information ranging from up-to-the-minute sports results, and bird watching information, to adult sex lines. These services are provided by so-called service providers, who all operate to the code of practice drawn up ICSTIS. These are examples of one call reaching many people in most instances. There are also a number of one to one services. Individuals who are not satisfied by the service, or feel the service provider is operating outside the Code of Practice can make a complaint to ICSTIS, which will be subsequently investigated.

5.9 So, we can see that in a 1:1 telephone call, it is the individuals speaking to one another who are responsible for what they say. On a premium rate service, which is often one:many, it is the service provider who is responsible for the content of the call. In neither of these situations is a network operator, such as British Telecom or Mercury, liable for the content of the calls, although they have an interest in effective regulation of calls to protect their good name.

5.10 Applying the analogy of a telephone to the Net, we suggest that a 1:1 e-mail is like a 1:1 telephone call. Individuals who send obscene or threatening e-mail should be prosecutable under the section 43 of the Telecommunications Act 1984. This is already the case if the e-mail is between two computers in the UK. A technical point for consideration here, however, is that some-e-mail between UK users can go outside of the country on its route to the receiver, depending on where the individuals connect to the Internet, eg. some UK companies have a gateway to the Internet in the USA. We would suggest that again, the spirit of the transaction is that the message remains within the UK, and therefore in these cases a message travelling via another country to a UK site should not be considered an import.

5.11 A situation of one:many communication on the Internet exists on list servers, usenet newsgroups, www sites, gopher and ftp sites. We can draw an analogy with individuals in these cases to the service providers on premium rate telephone services, who operate (generally) on a one:many basis. Just as service providers are responsible for the content of the messages that individuals can receive from them, we suggest that individuals who provide material on a one:many basis also have responsibility for what they "say" or make available.

5.12 It is also therefore logical to suggest that a similar regulatory system to that run by ICSTIS be proposed. ICSTIS does do a certain amount of active monitoring of the premium rate telephone services, but many of its investigations are initiated by individuals concerned about a particular service. In a similar way, if there was a recognised Code of Practice on the Internet, ICSTIS in a widened role, or another similar body, could investigate complaints or concerns from Internet users. In a similar way to British Telecom supporting ICSTIS, we believe that service providers should encourage good practice by users.

5.13 However, we would not expect an Internet service provider like Pipex or Compuserve to be ultimately responsible for what individual users do on the system. This again is analogous to the situation with telephone calls. Consequently, we have reservations about Senator Exon's Communications Decency Bill 1995 (S.314) in the United States which proposes to make companies responsible for what is done on their networks. We do, however, wish to see service providers promoting good practice, in a similar way to the attitude of BT to ICSTIS.

(b) *Books and Magazines*

5.14 The content of books and magazines is obviously as wide and diverse as is the range of subjects discussed on the Internet. However, just as pornographic books and magazines exist on paper, so do pornographic stories and pictures exist on the Internet. Indeed, *Playboy* has an "electronic magazine" available via the Internet, further demonstrating the analogy with "traditional" media. We therefore suggest that the same controls on the "paper version" should be applied to the computer versions, namely the Obscene Publications Act 1959.

5.15 The law relating to pornography and obscenity is complex, and has grown organically over the last 35 years forming "a patchwork quilt" of legal provisions. Over this "patchwork quilt" there is a single blanket law (in England and Wales) defining what is acceptable in terms of content of any media: the 1959 Obscene Publications Act (OPA).

5.16 The OPA revolves around the definitions of obscenity and publishing. In section 1(1), the OPA defines an obscene article, as one which "its effect . . . is such as to tend to deprave and corrupt persons who are likely, having regard to all relevant circumstances, to read, see or hear the matter contained or embodied in it." It is this definition of obscenity—not a definition of pornography—which has been the subject of debate for many years. There is general consensus that is not easy to understand or apply. A jury has to consider the impact of the material on the person, and the likely audience or readers/viewers of the material. Indeed, CARE continues to campaign for the OPA to be reviewed and made more effective.

5.17 An article is anything that can be read or looked at or both, any sound record and any film or other record of a picture or pictures (section 1(2)). The Government recently stated that they believed this definition included material that is kept on computer disc.[10]

5.18 The OPA makes it an offence to publish an obscene article, whether for gain or not, or to have an obscene article for publication for gain (section 1(3)). "Publish" has a wide meaning and is defined as including distributing, circulating, selling, giving, lending, offering for sale or for letting on hire. It also covers the playing, showing or projecting of obscene material. The Criminal Justice and Public Order Act 1994 amended the OPA to include the transmission of obscene material by electronic means under the definition of "publish".

5.19 Material that would otherwise be defined as obscene can be published for the "public good" if the material is "in the interest of the science, literature, art or learning, or other objects of general concern".

5.20 It is important to note that it is not an offence to possess indecent or obscene material, unless it portrays children (see paragraph 5.35, 5.36). However, it is clear that material posted to a Usenet newsgroup, or published on a world wide web page does fall within the legal definition of "publishing" and is therefore covered by the Obscene Publications Act 1959.

5.21 CARE recognises that have been no legal challenges in recent times against books under the OPA, since the Williams Committee concluded in 1979 that there should be no restriction or prohibition of the written word because of its "importance in conveying ideas". This has always seemed farcical because of the very explicit nature of some written publications, such as Juliette and Henry Miller's Under the Roofs of Paris, both of which contain graphic descriptions of sexual violence against children. There was outrage amongst child welfare charities that no prosecution was brought against either of these books.

5.22 When the OPA is applied to the Net, we suggest that there is one fundamental difference between books and the erotic stories available in the alt.sex groups, that of the intended audience. Pornographic material available from sex shops and on adult videos is clearly and legally available only for those over the age of 18. There are penalties for those who supply this material to underage individuals. However, on the Internet, there is unlimited access to all ages, and therefore all ages could be included in the intended audience.

5.23 We think that there is a justifiable argument for suggesting that the publicly accessible areas of the Internet should operate on the same principles as the BBC does before the 9 pm "watershed". Before this time it is assumed that children will be watching TV, and nothing inappropriate should be shown. After that time, more adult material can be expected. We cannot envisage a time when children would not be able to access this material as the postings and publishing are fixed items once on the Internet. Furthermore, because of the international nature of the Net, it operates across time zones, which makes a "watershed" impossible.

5.24 We recognise too that some alt.sex groups do have a warning that only those over 18 should access them. This is an acceptable limiter to children accessing these groups, if, and only if, there is an individual/organisation ensuring that children to not access this material. At the moment, this does not appear to be the case.

5.25 The application of the OPA to still pictures on the Internet clarifies confusion over specific queries raised in the ethics COG. For example, one contributor asked why is it illegal to post images of male erections and penetration on a bulletin board, but the same material is legal in The Lovers Guide video. An image on a bulletin board is analogous to a picture in a magazine, and this sort of material would be considered illegal in a magazine. However, it is legally portrayed in The Lovers Guide video because the video as a whole is classed as being educational and therefore can be published in the "public interest" (section 4 of the OPA).

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[10] Government Response to the Home Affairs Committee's Investigation into Computer Pornography, Oct 1994, Cm 2676, p3.

(c) *Videos*

5.26 Moving pictures on the Internet can be compared either with videos or films. We suggest that the former is more appropriate because a video can be viewed anywhere, in the same way as the Internet, whereas a film is seen at a locally licensed cinema, ie at a place specifically set aside for that purpose.

5.27 The content and circulation of videos is regulated in the UK under the Video Recordings Act 1984, which was significantly amended by the Criminal Justice and Public Order Act 1994. The Video Recordings Act sets out the criteria for classification of a "video work" and the penalties for supplying works outside of the classification. The Act is defined as applying to "video works", that is "any series of visual images (with or without sound) produced electronically by use of information contained on any disc or any other device capable of storing data electronically, and shown as a moving picture"[11] and "video recordings", that is "any disc or any other device capable of storing data electronically containing information by the use of which the whole or a part of a video work may be produced[12].

5.28 A video work is exempt from the provisions of this Act if it is designed to inform, educate or instruct, is concerned with sport, religion or music, or is a video game. If however, material falling within these categories is particularly violent or sexually explicit, it loses its exemption, and is subject to classification.[13]

5.29 Videos can be supplied in shops and video hire outlets except for videos classified as "R18", which can only be supplied through a licensed sex shop.

5.30 We suggest that moving pictures on the Internet, for example in MPEG or QuickTime file formats should fall within the provisions of the Video Recordings Act, making the individual responsible for the contents of the images. It would also mean that the pictures should be subject to classification, unless they fall within the exemption criteria (see 5.28) and that their "supply" should be restricted in the same way as videos are restricted, ie unrestricted distribution of a video classified "18" on the Internet would be against the principles of the Video Recordings Act.

5.31 Clearly, if material is imported over the Internet it will not be classified under the Act (see also paragraph 5.38 for the law on importing). However, in principle, if it is supplied to another individual in the UK, moving pictures will need to undergo the classification procedure, unless they fall within the exemption criteria.

5.32 There is also an analogy with moving pictures and legislation applying to broadcasting.[14] We can consider this by referring to the current plans for a "video on demand" service to be available to consumers. Videos will be chosen from a menu displayed on a television screen and sent via the telephone by a licensed service provider. We understand that video on demand will not be exempt from the Independent Television Commission's Programme Code, which contains guidelines on taste and decency. We believe that the principle of taste and decency in the content of moving pictures should also be applied to the Internet.

(d) *Post*

5.33 As there has been a considerable debate about the similarities between e-mail and "snail mail", ie, mail delivered by the Post Office, this comparison also has to cover the law relating to post. The Post Office Act 1953 makes it a criminal offence to send indecent or obscene material through the post. (Again, it is the individual sending the mail who is responsible for its contents, not the Post Office as the carrier.) It is also illegal under the Unsolicited Goods and Services Act 1971 to send unsolicited publications through the post which describe human sexual behaviour or advertise such publications.

5.34 Applying the law on post to the analogous e-mail, we would suggest that indecent or obscene e-mail should be covered by a similar law to the Post Office Act 1953 (although clearly it could not be this Act) and that unsolicited e-mail containing sexually explicit publications or adverts for publications should be treated in a similar way to the provisions in the Unsolicited Goods and Services Act 1971. In fact, the provisions of the Telecommunications Act 1984 may be appropriate to cover both of these circumstances.

A Comment on Child Pornography

5.35 The Protection of Children Act 1978 made it a criminal offence in England and Wales[15], to take, distribute, show, advertise or possess for distribution any indecent photograph of a child under the age of 16. The definition of "photograph" in 1978 included film, video, but was amended last year to include "data stored on a computer disc or by other electronic means which is capable of conversion into a photograph".[16]

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[11] Video Recordings Act 1984, section 1(2).

[12] Video Recordings Act 1984, section 1(3).

[13] Video Recordings Act 1984, section 2.

[14] Broadcasting Act 1990.

[15] Similar provisions are contained with the Civic Government (Scotland) Act 1982 and the Protection of Children (Northern Ireland) Order 1978.

[16] Criminal Justice and Public Order Act 1994, section 84(3) amending The Protection of Children Act 1978, section 7(4).

The definition was also extended to include so-called indecent "pseudo-photographs" which is an image manufactured on computer by the use of graphics or other means.[17] The Protection of Children Act does not apply to written material.

5.36 The 1978 Act was amended by section 160 of the Criminal Justice Act 1988 to make *possession* of child pornography illegal.

5.37 The definitions of the law related to child pornography make it clear that the principle of the law is that possession of child pornogrpahy is illegal, whether the images be computer generated or conventional photographs. Therefore, even if material is imported (see below), retention on computer or a print out of an image of a child under the age of 16 is a criminal offence under domestic law. We also consider that encrypted files of child pornography would be illegal because "they are capable of conversion into a photograph". Images of adults, retouched by a computer graphics artist so as to make it indistinguishable from a picture of a child are covered by the new provisions on "pseudo-photographs".

The Law on Importing Obscene Material

5.38 The Customs Consolidation Act 1876 does not allow individuals to import into the UK obscene articles (eg videos, books, CD-ROMs). Legal interpretation and precedent includes pornography on a floppy disk or a computer's hard disk[18] (including material that has been encrypted). Postal packages coming into the country are surveyed by Customs officials for obscene material and drugs. Individuals importing either of these materials can be prosecuted. The UK's application of an import prohibition on obscene material from other European Union member states was recognised and accepted by the European Court of Justice in a 1979 case.[19]

5.39 However, because electronic communication cannot be defined as a "tangible item" in the same way as a video, it does not fall under the jurisdiction of this Act.[20] It is therefore not illegal to import computer pornography into this country via the Internet, while it is an offence to import exactly the same material on video (for instance). This position is clearly a legal anomaly, but proposed amendments to the law were rejected by the Government during the passage of the Criminal Justice and Public Order Act 1984. In its response to the Home Affairs Select Committee's investigation into computer pornography, the Government acknowledged the practical difficulties in enforcing any tightening of the law in this area, but had sympathy with the Committee's concerns about the present law, and said it was "keeping the matter under active consideration".[21]

5.40 The issue of importing material again raises the question of regulating the Internet when different countries have different standards of acceptability of material, ie what may be legal in one country once imported is illegal here, and when is the data an import. In this latter context, some individuals have made a distinction between "downloading" a picture and "viewing" it. We would argue that this is an incorrect technical distinction because if a user accesses a bulletin board, for instance, in Germany, they will automatically be downloading the image into the computer's memory to view it, and therefore the material has been imported. Possession of the material would not be illegal in itself unless it was child pornography (see section 5.36). Material retained for future use and passed to other individuals would come under the jurisdiction of the Obscene Publications Act 1959.

Application to the Internet: Conclusions

5.41 Having reflected on each of the constituent types of media we are now able to draw the model together and conclude that the Internet is like an electronic book, video telephone, and mail system, all rolled into one. Therefore the following UK legislation is relevant to the Internet:

- the Obscene Publications Act 1959;
- the Protection of Children Act 1978;
- the Video Recordings Act 1984;
- the Telecommunications Act 1984;
- the Broadcasting Act 1990.

5.42 The principles of the Post Office Act 1953 and the Unsolicited Goods and Services Act 1971 also apply to the Internet.

5.43 The Customs Consolidation Act 1876 does not apply to the material imported into the UK via the Internet. This is clearly an anomaly, which should be rectified as recommended by the Home Affairs Select Committee, after their investigation into computer pornography.[22]

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[17] *Ibid,* section 7(4).

[18] Home Affairs Committee, *Computer Pornography,* First Report, Feb. 1994, HC 126, p x.

[19] *Ibid.* p28.

[20] *Ibid,* p 32

[21] Government Reply to the Home Affairs Committee Report on Computer Pornography, October 1994, pp 3 and 4

[22] Home Affairs Committee, *Computer Pornography,* First Report, February 1994, HC 126, p xi

5.44 CARE believes the law needs to be clear, consistent and enforceable. We recognise the difficulties that individuals have had in understanding how current statutes apply to the Internet, because of the complexity of the different measures. We urge the Government to ensure that there is consistency in their approach to applying the law to the Internet. Indeed there is a strong case for consolidating these statutes into one not just for the Internet, but for all media. We also raise again concerns that we have expressed on many occasions about the recognised problems surrounding the definition of obscenity.

5.45 Alongside the current laws, we believe that there does need to be a code of practice put in place with the agreement of *international* agencies and service providers to promote good practice. A similar organisation to ICSTIS, on an international scale, would give some "teeth" to the operation of a code of practice and would be a central point to which individuals with concerns about a particular material could refer. We suggest that the UK Government could take a lead in promoting such an initiative internationally (see also paras 6.10 and 6.11 below).

6. ENFORCEMENT OF THE LAW

6.1 CARE strongly believes that good enforcement has to go hand in hand with good law. One without the other brings the legal system into disrepute.

6.2 There has been much discussion on the ethics COG about the issue of enforcement. We consider that the issues behind enforcement have been dismissed in one sweep because of the view that "enforcement on the Internet is impossible". This then leads to the argument that there is no point in creating any rules if they cannot be enforced.

6.3 CARE believes this understanding is flawed. We suggest that the issue of how a law can be enforced is separate from the *intent* of the law. It is therefore the latter point that needs deciding before any decision can be made about the method of enforcement. Our views on the intent of applying current laws have been expounded in the previous section.

6.4 We have considered the application of this approach to other crimes. It is the intent of UK law that murder, sexual offences and burglary (for instance) should not committed. The Government promotes *crime prevention* schemes like Neighbourhood Watch, and other community measures. Our citizens know the intent of the law and know that if they commit a crime, the legal system will do all that it can to bring the individual to justice. The police do not solve each crime. However, millions of pounds are spent each year on improving police procedures and scientific techniques to investigate and solve crime. CARE believes that this combination of prevention and investigation should be applied to criminal offences committed on the Internet.

6.5 CARE believes that there are enough computer experts on the Internet who could seriously consider solutions to the some of the technical problems of enforcement that currently exist, if there was a sufficient will for change.

6.6 Any measures of prevention will need to include making the law on what is and is not an offence on the Internet clear to the users, thus combatting the concern of a contributor to the ethics COG that "trying to impose the ludicrously vague law on an individual who cannot be expected to know the current interpretation of law in the UK let alone international law will leave a trail of hurt people".

6.7 We believe that there has to be a central Government commitment to the training of police officers to combat all forms of computer crime. It is not sufficient for the Government to say that this sort of training will be determined by individual Chief Constables in the light of operational requirements,[23] and at the same time encourage the public to contact the police if they think there are illegal activities taking place on the Internet.[24] CARE knows of only two or three police officers with any specialist training on computer pornography. We therefore welcome the initiative of the Association of Chief Police Officers to set up a working group on computer pornography to offer guidance on training and investigation techniques.[25]

6.8 We believe effective police action needs to be taken against paedophiles using the Internet either for exchanging information or for luring children into abusive relationships.

6.9 We also suggest that consideration is given to amending the internet protocol (ip) so that locating the originator is possible and falsifying an identity is impossible. However, we recognise that this would require international agreement as the structure of the Internat means that if an anonymous remailer does exist somewhere it can be found and used. Unfortunately, such international agreement on computer networks does not currently exist.[26]

6.10 We strongly recommend the Government to institute international co-operation between governments and law enforcements agencies to uphold the law, especially in cases of child pornography, violent sexual material and personal threats to individuals. Similar inter-government co-operation has taken place on matters of taste and decency in television broadcasting within the European Community, for instance, on the European Convention on Transfrontier Television.

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[23] *Official Report*, written answer, 20 February 1995, c 21

[24] *Official Report*, written answer, 2 March 1995, c 662

[25] *Official Report*, written answer, 1 May 1995, c 98

[26] *Official Report*, written answer, 21 March 1995, c 113

6.11 We urge the Government to use current Interpol structures, the 1910 Treaty and the 1923 Convention for the Suppression of the Circulation of Obscene Publications[27] as vehicles for beginning discussions between nations, on some of the areas of concern on the Internet. We encourage the Government to ask the United Nations to hold a conference of signatories of the 1923 Convention, or to initiate an international meeting in this country.

ANNEX: REFLECTIONS ON SPECIFIC ISSUES RAISED WITHIN THE ETHICS COG

Anonymous e-mail

1. "An anonymous remailer is simply a computer connected to the Internet that forwards electronic mail or files to other addresses on the network. But is also strips off the 'header' part of the messages, which shows where they came from and who sent them. All the receiver can tell about a message's origin is that is passed through the remailer."[28]

2. One of the latest cases to hit the headlines on the question of anonymous e-mail is that of the remailer in Finland, raided by the Finnish police, on a request from Interpol, to discover the real mail address of the user who had allegedly posted material stolen from the Church of Scientology. This has raised issues of privacy, legality and personal responsibility.

3. Extending our analysis of media developed in section 5, we can sensibly consider the issue of anonymous e-mail, if we assume that a 1:1 e-mail is the same as a 1:1 telephone call. Anonymous telephone calls can easily be made, one example being the typical "heavy breather" phone call. If these calls are harassing or obscene the individual making the call is committing an offence under the Telecommunications Act 1984. If they are identified, and the technology exists now to trace these calls, they can be prosecuted. Or alternatively, the 1:1 e-mail can be compared to mail sent through the post. Offences related to obscene or indecent post are covered by the Post Office Act 1953. In both of these cases it is the individual who initiates the message that is legally responsible for its contents.

4. We believe that the same principles should apply to anonymous 1:1 e-mail and 1:many e-mail, which can be compared with the service providers of premium rate telephone services (see para 5.8). We agree with a contributor to the ethics COG that invididuals should be responsible for their own actions and not hide behind an anonymous posting. We do not want to see harassing of minority groups through anonymous mail.

5. However, we do recognise that there are instances where individuals may wish to or need to post anonymously. Instances where this may be necessary have been given as:

- various recovery groups/self-help lists, eg alt.sexual.abuse.recovery, Samaritans, soc.aids;
- postings which may lead to persecution if the identity of the individual is known.

6. We would favour a code of practice of "netiquette" that encourages users to agree whether anonymous e-mail should be used within a particular group when it is set up. Therefore, in cases like e-mail to the Samaritans there would be a clear agreement for there to be total anonymity.

7. Clearly there are legitimate concerns about the use of anonymous remailers for terrorist aims, distribution of pornography, money laundering and information on drugs. In these cases, we do believe that police should be able to approach system administrators for assistance in identifying individuals suspected of criminal activity.

Privacy of e-mail

8. There has been some discussion on the ethics COG about privacy of e-mail. A summary of the arguments is:

- if any material is being looked at by system administrators, government bodies or ip-providers, the individual should encrypt their message using PGP (pretty good privacy);
- e-mail should be regarded like a postman regards a postcard; the postman may glance at it, but has a professional duty not to repeat or use the information contained on the postcard.

9. Another source has suggested that we do not invade the privacy of hotel rooms where criminal deals are agreed, and therefore in the same way, there should not be invasion of anonymous mailing.[29] We disagree on this point of principle: a hotel bedroom is indeed private; the Internet is a public forum. This needs to be recognised in all communication between individuals. Therefore, there may only be a limited amount of privacy.

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[27] For information on the Treaty and Convention see *Official Report*, Written answer, 31 March 1995, c 847

[28] Identity Crisis on the Internet, *New Scientist*, 11 March 1995, p14

[29] *Ibid*, p15

Ownership, Copyright and Data Protection

10. We consider that intellectual property rights are going to need to be guaranteed for there to be long-term sustainable investment in the Internet. We are concerned that the use of anonymous remailers is able in principle to breach current copyright laws. This is an area beyond our expertise, but we recognise that it is an issue that needs serious consideration by the Government.

11. We also believe that data protection issues need to be considered by the Office of the Data Protection Registrar.

Child Safe Access

12. It has been suggested that service providers should provide "child safe" access as an option for parents and teachers. This would involve restricted access to ftp, www etc sites, and no access to the alt.* hierachy, and no posting or receiving of mail greater than 10k. We believe that this sort of facility would be welcomed by parents. Our views on the possibility of "call barring" are given at section 4.14.

13. We certainly advocate parental responsibility and education in ensuring children do not misuse the Internet, but equally we recognise that as most children are more computer literate than their parents, this could be difficult. Parents do need to be aware that their credit cards could be used by children to access some material, without their permission. Other material is apparently "free" and is accessible as soon as the user "logs onto" the Internet. This fact makes the Internet an attractive source of pornographic material for teenagers.

14. We welcome the recent Government advise to schools and parents on computer pornography issued by the National Council of Educational Technology.[30]

Advertising

15. Another issue raised within the ethics COG is the increasing commercialisation of the Internet. One of the areas this will affect is advertising, and the question of whether advertisers can send unsolicited adverts via e-mail. Here the analogy with telephone advertising or mail advertising falls down, because in these cases the receiver does not bear any cost, whereas, in most cases, an Internet user has to pay for the material retrieved from a mail box. We would propose that such advertising is not allowed.

16. Clearly, there is a different scenario when individuals go to a Web page in search of supplier information and we see this as legitimate business practice. We do believe that a "watchdog" would be needed to oversee advertising on the Internet, in a similar way to adverts on other types of media (eg regulation by the Advertising Standards Authority and Independent Television Commission).

Normalising sexually deviant practices

17. We accept that the Internet is bringing together individuals of a similar taste, who are not likely to be influenced to change their current behaviour. However, we are concerned that in the future, this material will be available to teenagers at a time when they are deciding about their sexuality, and that its existence on the Internet will be giving a message of acceptability.

18. We consider that discussing sexually deviant practices "if they are consenting adults and they are not harming anyone else it's OK", is inappropriate when what is taking place is in the public domain, and not behind closed doors. Nor do we see it advantageous that "dangerous idiots are out in the open" where we can see them. Recent legislation in the USA giving addresses of released sex offenders has led to these individuals being harassed after serving a prison sentence. Surely, this is not in the spirit of the Internet.

Libel

19. CARE does not claim to have special expertise on the law on libel. We do, however, wish to make some comment on the debate that has taken place in the ethics COG. The main issue of contention on publishing libellous statements on the Internet, is "Who is responsible?". The argument centres around whether it is the individual or the carrier of the message. By the extension of our previous arguments on e-mail, we suggest that the publisher of the message/document must be the one responsible.

May 1995

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[30] Available from the National Council for Educational Technology, Milburn Hill Road, Science Park, Coventry, CV4 7JJ.

Memorandum by Communication Workers Union (CWU)

The CWU—which represents some 250,000 workers in telecommunications, posts and related industries—welcomes the current enquiry on the information superhighway being conducted by the House of Lords Select Committee on Science and Technology. We gave both written and oral evidence to the inquiry into broadband networks conducted by the House of Commons Select Committee on Trade and Industry and we should like to take this opportunity to submit at least written evidence to your own enquiry.

Section 5 of your terms of reference is of particular interest to us since it concerns the role of government. Although the terms of reference do not use the word regulation, in our view, government has a key role to play in setting the appropriate regulatory framework to encourage all relevant players to build the information superhighway. I enclose a short statement of CWU policy on this subject and a separate statement explaining in more detail the nature of the so-called asymmetry rule which—in our view—is a major regulatory obstacle to the development of the information superhighway in this country.

Section 7 of the terms of reference is also of great interest to us since it concerns the impact of the information superhighway on working practices and employment prospects. We have carried out some work in this area ourselves and we are submitting the paper which was the result of this enquiry.

Tony Young
Joint General Secretary

23 January 1996

CWU POLICY ON THE INFORMATION SUPERHIGHWAY

The communications network that we want to see would be:

- two-way, unlike most existing cable TV networks;
- broadband, unlike the existing telephone network;
- national, offering services to almost all homes and businesses throughout the country.

The creation of such a network in Britain is vital to our international competitiveness in the global economy. Our principal competitors—the USA, Japan and Germany—all have programmes in place to bring about the Information Superhighway and, if we fall behind them, it will adversely affect our competitive position.

As the only organisation able and willing to create a genuinely national and genuinely broadband network for Britain, BT should be permitted to play its full role in building the Superhighway by the lifting of the current regulatory constraints.

Specifically, the ban on BT carrying entertainment services on its telecommunications network should be lifted, preferably on a national basis and as soon as possible, but certainly in accordance with a firm, pre-announced time-table that will enable the Company and its many suppliers to plan their investments and deployments.

The constraints on BT's use of radio tails for the local loop should be lifted so that, where radio links are the most cost-effective solution, the Company is free to use the relevant transmission technology.

The regulation of telecommunications and broadcasting—certainly as regards infrastructure, if not content—should be brought together under one authority, since modern digital networks simply do not distinguish between telephone calls or television pictures.

Government should use its purchasing and promotion power as a major user of the new networks, especially in the provision of public services for the 21st Century, covering especially education, training, health and social services.

Government should encourage, sponsor, and even pump-prime demonstration projects, bringing together a range of operators and service providers to showcase some of the possibilities of the new technology and to test the market demand for the new services.

Government should sponsor research into the employment impact of the Information Superhighway, so that we know which jobs are likely to go, where jobs will be created, and how best to smooth these processes so as to promote maximum employment growth and rising standards of living.

More specifically, government needs to create the appropriate legislative, taxation and social security framework which will enable the growth of teleworking while protecting the employment and social rights of such teleworkers.

Government needs to address a range of legal issues that threaten to inhibit the rapid development of innovative services, especially such questions as intellectual property protection, privacy and security.

Above all, government should overcome what the Select Committee called "lack of a clear sense of vision or excitement about what broadband communications could do for the UK and its people", and instead champion in a high profile and imaginative way a new vision for the British Information Superhighway in the same way as Vice President Al Gore has done in the USA.

Roger Darlington
9 March 1995

EXPLANATORY NOTE ON THE ASYMMETRY RULE

The so-called asymmetry rule is far more complex than is commonly understood and is certainly not simply the blanket ban on BT providing entertainment services that it so often represented. Indeed the very term asymmetry is not used in government or Oftel publications, but it is a shorthand term which is popularly used by the media.

Insofar as the current situation represents an asymmetrical—or unbalanced—relationship, cable television operators are allowed to carry telephone services on their cable networks whereas British Telecom—and other public telecommunications operators—are not allowed to carry entertainment services on their main telecommunications networks.

However, the Cable Communications Association would argue that this is not asymmetry, since BT and other public telecommunications operators are able to bid for local cable franchises and in those cases would be able to carry both entertainment and telephony services on the same network (a different network from their main telecommunications network). Instead, the CCA argues that, if BT was allowed to carry entertainment on its national telecommunications network, then this would be asymmetry because cable television operators can only carry entertainment and telecommunications services on their local networks and not on a national basis.

The full definition of the current regulatory situation is set out in the government White Paper entitled "Competition and Choice: Telecommunications Policy for the 1990s" (Cmnd 1461) which was issued in March 1991.

The White Paper distinguishes between conveyance—the simple carriage of signals within the network—and provision—the preparation of programmes and the packaging of these into channels.

Currently, BT can do the following things in relation to entertainment services:

- conveyance within the network (excluding the "final drop");
- conveyance to business customers;
- conveyance to residential customers as an agent of the cable companies;
- provision in existing local franchise areas through a subsidiary company;
- provision in new local franchise areas in its own right.

BT cannot do the following things in relation to entertainment services:

- conveyance to residential customers in its own right;
- provision in existing local franchise areas in its own right;
- provision nationally in its own right.

As regards conveyance, the prohibition lasts until March 2001 with a possible review in March 1998. As regards provision, there will be no review until at least March 2001 and even then there is no guarantee that the prohibition would be lifted.

The proposals of the House of Commons Select Committee on Trade and Industry in relation to the relaxation of the current regulatory arrangements can be summarised as follows:

- all areas not yet franchised should be offered for franchising to any operator by the end of 1995;
- all areas not then franchised should be open to any operator to provide any service;
- all local cable franchises should be exclusive for seven years from the granting of the original licence;
- Oftel and the Independent Television Commission should lift restrictions on public telecommunications operators on a franchise by franchise basis at specified future dates;
- all restrictions on public telecommunications operators should be lifted by the end of 2002.

The Select Committee formula was the best that could be obtained from an all-Party body and a very useful advance of the debate on asymmetry, but this approach contains at least three significant problems:

1. BT and Mercury are national organisations and will want to provide entertainment services on a national basis. The Select Committee approach would imply that BT's investments in the local loop should bounce around the country geographically as one franchise after another is open to competition and it would mean that different BT customers in adjoining localities could be offered the same new services at different intervals up to seven years apart.

2. The Select Committee timetable would mean asymmetry would not be lifted everywhere until December 2002 which means that, viewed nationally, the package offers no real advance on the timetable of the current government which might be expected to lead to the lifting of restrictions by the end of March 2001.
3. Above all, the Select Committee approach would be complicated to administer, whereas regulation ought to be easy to operate and understand. There would be argument over when the seven year period should be deemed to have started. The Select Committee report itself does not make clear whether the start date would be when the award of the licence was announced or when it was formally granted and the Director-General of Oftel has suggested that the start date ought to be the award of the telephony licence rather than the broadcasting licence (others might even argue that the start date should be the actual commencement of the telephony service).

A clearer and better approach would be to:

- cease the complicated distinction between conveyance and provision;
- allow both conveyance and provision at the same time on a *national* basis;
- announce a clear and fixed timescale for this;
- set the date at a time which gives reasonable opportunities to enable franchise owners to exploit their existing investments and reasonable notice for BT and others to plan their future investments.

If the Select Committee approach is to be adopted, then two important qualifications are necessary:

1. Competition in any particular franchise area should be permitted seven years after the *award* of the original *ITC* licence.
2. Whatever happens to the franchising process from now on, *all* restrictions on conveyance and provision of entertainment services should be lifted by 31 December 2002.

"Communicating Britain's Future"—the report of the Labour Party Policy Forum on the Information Superhighway published on 17 July 1995—states:

> *"We believe there is a strong case for ending the uncertainty currently affecting BT and other telephony providers, and making explicit the timetable for them to enter the entertainment market. We conclude that the proposal advanced by the Trade and Industry Select Committee, for a rolling programme of entry into the cable franchise areas beginning in 1998, is the best basis to achieve this. We believe that this would protect the legitimate interests of the cable companies themselves, while providing certainty for BT and others, and ensuring a proper competitive environment for the benefit of the consumer. We would also propose, in accordance with the Select Committee, that full and open competition be permitted everywhere from 2002."*

Memorandum by the Confederation of British Industry (CBI)

INTRODUCTION

1. The CBI welcomes the opportunity to submit evidence to the House of Lords Science & Technology Committee during the investigation into the "Information Superhighway". The enquiry comes at a significant time during the development of the delivery infrastructure and services required to develop what can be considered an "Information Society".

2. This paper is aligned with the questions listed in the Call for Evidence, although there are some additional comments relating to legal and security issues.

What is the current form of the "Information Superhighway", and how is it developing (i) in the United Kingdom and (ii) worldwide? What specific problems arise from incompatible network standards and why are these incompatibilities arising?

3: The "Information Superhighway" is a concept not a physical entity. Essentially, it comprises the range of options offered by the telecommunications infrastructure which allow two-way interactive communications. Consideration must also be given to the public switched telephone network (PSTN) but, in general, one is considering network elements which allow two-way text, graphics and images (not necessarily real-time full motion video). The Internet may be considered one, relatively slow, component of the Superhighway.

4. The CBI believes it is too simplistic to consider the Information Superhighway in isolation. To many, the much-publicised "Information Superhighway" has become synonymous with the "information society". While the "Information Superhighway" concept of a ubiquitous digital communications network has increased public perception of trends in information technology and telecommunications, the key to the creation of an "information society" does not lie exclusively with technology; it is as much, if not more, a question of the information sources and content which "users", in every sense of the word, will need to understand and seek to access. All users will have their own requirements but all will expect their "information

environment" to be tailored for their own use. But if past experience is anything to go by, many of the new systems will not come quickly or efficiently.

5: We identify five elements which combine to create the concept of an "information society":

- — information sources and "content";
- — communications network infrastructure;
- — generic network services;
- — information applications (sometimes called telematics) and:
- — creation of widespread user understanding and demand.

6. The Internet is the major current manifestation of the "Information Superhighway", both in the UK and worldwide. Its advantages are that:

(i) it uses existing networks;

(ii) its scope is worldwide;

(iii) participation is available relatively cheaply and easily and;

(iv) it is already rich in information, much of it free.

7. Increase in use of the Internet over the last few years has been phenomenal. This is despite the Internet's faults: access to information is slow; applications are limited in general to text and low-quality graphics, security of transaction is not yet possible; and the current cost of communications is high. Nevertheless, it seems at this point to be the medium of choice for consumers (as opposed to businesses) who wish to step into the Information Society.

8. The growth of the Internet has created many new and profitable opportunities, although these have primarily been seized by US companies.

ISDN

9. After a long gestation period, ISDN lines are becoming more popular with businesses, due to their greater capacity.

Broadband cable

10. The UK has among the most advanced cable networks in the world. So far, £5 billion has been spent to establish a fibre-optic backbone in the majority of the 143 cable franchises. To date, this new fibre-optic network has passed more than 5 million of the 16.2 million homes within the UK. Homes and businesses connected are slightly over 1 million, and there are some 500 schools also connected.

11. As is well-known, the services offered to subscribers include a wide variety of entertainment services and telephony, as well as (in certain cases) ISDN lines. Other than telephony, however, the services offered are similar to those offered for the last 20 years to cable subscribers in North America.

12. Cable operators will have to make a significant additional investment to upgrade the final connection to the home offer greater interactivity and additional services. This upgrade will involve converters from analogue to digital. While cable operators have made no specific commitments to such upgrades, it is likely that they will have to make the additional investment soon in order to compete with satellite television.

13. British Telecom has also announced a plan to lay fibre-optic cable as far as their street cabinets. In the medium-term, this plan offers the welcome prospect both of competition with cable operators' networks and of wider potential availability of services, for instance to homes, businesses and educational establishments outside cable franchises.

Broadband wireless

14. Another potential "Information Superhighway" is the radio spectrum. There has been dramatic growth in the use of mobile phones and there is potential to extend the use of the spectrum thus allocated to data transfer and mobile computing.

15. As can be seen from the foregoing, there are a number of existing "information highways" already available or in prospect of development. The CBI believes that the UK leads Europe as regards the development of such highways, primarily because the UK has been at the forefront of liberalisation of telecommunications. By all accounts, the UK is also well ahead of Japan and, in some aspects (competition in local telephony) ahead of the US.

16. Underpinning the future development of the "Information Superhighway" is the requirement for a legislative and standardisation framework which will ensure there is stable environment sufficient to encourage the high levels of investment essential for its future development.

What services are being provided, and should be developed/will be required?

Commerce

17. The PSTN (including the Internet) and private circuits are the primary networks for service providers.

18. Currently, the single most important use of information highways ie e-mail, which has grown significantly as an inexpensive and convenient means of communication. It is believed that UK is amongst the heaviest users of e-mail in the world and growth in its use by companies is likely to continue.

19. Use of the Internet for retail has not yet reached its full potential. Thousands of companies advertise their goods on the Internet, often reaching new customers very inexpensively, but the actual volume of transactions remains very modest as security of transactions remains a major concern. As this problem is overcome, however, there may be many new opportunities for niche suppliers as well as major retail groups. There are also considerable opportunities for manufacturers to communicate directly with their customers, allowing them to determine precise needs, tailor products to the individual and market directly to the consumer.

20. On-line services are a growing application area. Such services essentially involve subscription payments in exchange for high value information. Another increasingly prevalent application is private networks within companies and between companies and their suppliers. Principally in the form of EDI, private networks are essential to improvements in efficiency in areas such as manufacturing, stockholding and distribution. The resulting improvements in efficiency will bring benefits to consumers as well as contribute to enhancing the competitive position of firms which adopt them.

Finance

21. This is the area where applications are highly developed and now ubiquitous. Early adoption has enabled London to remain one of the global centres for finance.

Entertainment

22. Entertainment services aimed at consumers are frequently seen as one of the main applications on the "Information Superhighway". However, there is very little evidence of significant demand so far for interactive entertainment services. As a result, entertainment applications are still taking place as trials, both in the UK and the US. It seems to have become accepted that such applications will not in fact pay for the construction of a ubiquitous broadband network to the home, as was initiallly envisaged.

The future

23. It is not possible for the CBI, nor any other body or person, to accurately forecast future demand for applications. However the UK Government's Technology Foresight Programme should provide some pointers as to the direction of future developments. Because of the rapidity of technological change, it is essential that the scenarios identified in the panel reports are periodically reviewed.

24. It is evident from the remarkable development of the Internet and the disappointing results of trials of entertaiment applications, neither of which was foreseen, that markets evolve in surprising ways. In general, consumers and businesses do not appear to be ready for revolutionary change. In particular, they will only embrace applications which provide meaningful and quantifiable benefits.

ADDITIONAL COMMENTS ON LEGAL AND SECURITY ISSUES

Security of payment

25. Security of payment is fundamentable to the enabling of electronic commerce. In the first instance, this is perhaps an issue for the banks and the companies designing the technology to satisfy themselves.

Data protection, confidentiality and censorship

26. On the issue of data protection in the UK, we have the Data Protection Act 1986 and last year the EU adopted the Data Protection Directive which now has to be implemented in Member States and which involves some change to UK law. However the proper concern for privacy must not prevent legitimate business from being conducted electronically across borders. Security of payment referred to above is but one example of the problems to be resolved. Whilst this new technology allows many business transactions to be handled in a paperless fashion, commercial and contract law is often based on a paper system.

27. On confidentiality, there have been widespread developments in cryptography. Cryptography is essential both to the confidentiality of information and to information integrity. One issue for national governments and industry is that modern encryption technology is effectively uncrackable, but law

enforcement and defence intelligence need to be able to intercept communications. Therefore national governments subject encryption technology to strict controls. However, this affects the ability of companies to benefit from the new technology and for companies producing such products to maximise their sales worldwide. CBI members have expressed concern at difficulties and delays in getting export licenses from the DTI.

28. With the advent of the Information Society, the CBI is also concerned with ethical issues relating to computer misuse, such as hacking and computer pornography and has supported initiatives to improve education and training in schools, colleges and elsewhere by the National Council for Educational Technology and the British Computer Society. The CBI also hopes to publish shortly some IT Security Training Guidelines for use by businesses and organisations generally.

Verification of information

29. This is all part of the process of enabling electronic commerce discussed above, and companies are seeking to develop the appropriate technology.

Who will supply these services to consumers in the United Kingdom? How can the participating companies be categorised and what is the nature of the commercial relationships between them? What service standards exist and how are they likely to evolve?

30. As may be understood from the foregoing, there is a considerable range of services available and these are supplied by a range of companies. Telcos (telecommunication companies) and quasi-telcos (such as cable operators) are significant suppliers, as are information providers such as Reuters and Extel. US on-line service providers, such as CompuServe, America On-line and Microsoft, are showing increasing activity.

31. Small companies also have a role to play, some of which are involved, for instance, with designing Web sites or new services on the Internet.

32. In the same way as forecasts for services are unreliable, it is not possible to forecast which suppliers will lead in the future. It is plain, however, that companies active in the UK (whether British or non-British) have proved capable of supplying services which meet consumer demand.

How can universal access to services provided for the common good be secured within a commercially competitive market framework?

33. This question is presumed to be an extension of the "USO" (universal service obligation) policy referred to in draft liberalisation of telecommunications. The CBI believes that access to comprehensive interactive information services can only be based on commercially competitive market considerations. Otherwise the substantial private investment needed to establish the services will not be forthcoming.

34. The question of "affordability", which is frequently what is meant by "universality", of access can then be considered in terms of the "common good" referred to in the question. This approach also allows other aspects such as education and training to be taken into consideration—what is the point of universal access for someone who does not understand how to use a service or what to use it for? Social policy and economic policy should not be confused when planning for the information society.

35. Furthermore, it is plain from the examples of services mentioned above that consumers will gravitate towards the services most relevant to them. Their needs and wants will vary widely.

36. For example mobile telephony, satellite television and connection to the Internet are accessible to most UK homes, and price is relatively low. But only a small percentage of the overall population chooses to subscribe to such services. Moreover, there is no systematic link between demand for different kinds of services. For instance, the demographic characteristics of satellite television subscribers are very different indeed from those connected to the Internet.

37. Even in the consumer electronics area, penetration of long-established goods such as colour television, VCRs and CD-players is not 100 per cent.

38. The CBI doubts whether it is necessary or even relevant for the "USO" policy to be extended into the "Information Superhighway". If it were so extended it is doubtful that the economic benefits of the information society could be realised in the immediate future.

What is the role of Government in connection with the "Information Superhighway" service provision?

39. The Government has a crucial role in the development of the "Information Superhighway", firstly in the field of regulation and deregulation. As noted previously, the UK is at the forefront of developments in the Information Society because it has long been in the lead worldwide in liberalisation of telecommunications. Such liberalisation has, among others led to the significant real decline in domestic and business telecommunications costs which has been a critical factor in widespread adoption of the Internet, EDI and other private networks.

40. Government telecommunications policy has also led to the significant inward investment by foreign companies in cable television. These companies were attracted in part by the potential rewards of competition in telephony. The CBI would wish to see such liberalisation continue.

41. The Government also plays an important role in raising the profile of the Information Society, promoting inward investment, promoting liberal telecommunications regimes in other countries, working within international standards bodies to promote common standards, and developing protection of intellectual property rights to suit the new media.

42. The DTI has a number of initiatives in train to assist companies in the software and network areas. Moreover, Government policy on education is a vital component in training young people in such a way as they will be able to find future employment in a computer-intensive and business environment.

Access to Government information

43. The CBI would encourage the Government to make as much use as possible of the "Information Superhighway" in providing access to and distributing Government information. Under the "Open Government" initiative electronic access to Government information via the World Wide Web has made great strides and we look forward to continuing progress. In additiion, the agency CCTA promotes the efficient use of information and IT in government departments and the DTI spearhead database on Single Market topics remains a useful example which only Government could provide.

44. However, the CBI considers there is fragmentation of responsibility for information policy amongst government departments. We believe there is scope for a coordination mechanism responsible for information initiatives and national resources, reporting to the Cabinet.

45. An example of successful coordination (but only at one level) is the DTI's Business Link which provides delivery of business information through local outlets, a branded image and recognition of the role of information/knowledge as a strategic asset in achieving and retaining a competitive edge internationally.

What is the role of local and regional Government in connection with the "Information Superhighway"? How can new services be used to boost (a) the ongoing regeneration of urban areas and (b) other local economies?

46. Local and regional Government should implement the most efficient mechanisms for their activities, although this may lead to declines in government employment. Local education policy is also a key determinant of future prosperity in specific regions.

What will be the impact of the "Information Superhighway" on working practices and employment prospects?

47. There is large potential for growth in employment in the Information Society, albeit in new forms and types of employment for which education and training will be required. At the same time in the UK there is a threat to traditional sources of employment in manufacturing and the production of material goods due to the newly developing Asian economies based on their lower wage and social cost structures. It is particularly important therefore to manage this change to avoid social upheaval and the consequential cost. Government policies, both economic and social, should take account of the need for time to implement the considerable changes implied by the development of the information society.

New ways of working

48. There has already been considerable growth in teleworking. Teleworking allows much more flexibility and has the potential to help revitalise depopulated communities. Teleworking is of particular interest to men and women seeking a better balance between the exigencies of work and family. Teleworking can accommodate both full-time and part-time employment.

49. Another interesting trend is the creation of virtual organisations, where teleworkers link together within companies which require little or no office space. Virtual organisations have the potential to unleash entrepreneurial ideas where set-up costs might be a barrier.

50. Neither of these trends should be over-emphasised. Many business tastes are unsuited to relative remoteness from customers, suppliers or colleagues. Moreover, many employees prefer to work in physical proximity to their colleagues.

Is the dominance of mass-market US software a threat or an opportunity? What hard commercial initiatives can be made (as opposed to "collaborative" ventures such as RACE or ESPRIT) to respond to this dominance?

51. It is questionable whether the mass-market software currently available will be completely suited to the development of the overall service—"software" in the context of the Information Society must also include information content and the UK has considerable expertise and experience of this aspect. The UK has an opportunity to develop commercial products for the Information Society.

52. The apparent dominance of US mass-market software need not be viewed as a negative factor in the evolution of the Information Society. US software has enabled British companies to achieve many important commercial and financial benefits, often ahead of European and other competitors. Moreover, while US software is pervasive, there are many opportunities for the traditional strong software development skills of the British. Certain UK companies have powerful niche positions.

53. There are many British companies and developers engaged in writing CD-ROM software, sometimes for US companies but often for their own marketing. For instance, Dorling Kindersley has had considerable success in the UK, Europe and the US with its "edutainment" CD-ROM titles. British games developers have had a strong record of success in the UK and US.

54. UK database and on-line companies appear to be more than holding their own against US competitors. Reuters and Extel are particularly well-established. They benefit from a great awareness of the content needs of British and other European companies.

55. In addition, UK companies benefit from the common use of English. US companies have established many links with British software and hardware companies. The CBI does not see the necessity for any specific initiatives to combat US dominance of the mass-market software markets.

February 1996

Memorandum by De Montfort University

1. CURRENT FORM OF THE INFORMATION SUPERHIGHWAY

The Information Superhighway (IS) is a worldwide complex of interconnected networks of varying capacity and bandwidth. These are a mixture of dedicated and dial-up networks, commercial and non-commercial, free at point of use, pay-as-you-go, and subscription based. Like any highway the capacity of the network is limited to the capacity of the narrowest path on any route you wish to travel. The term superhighway is however usually taken to mean "high bandwidth" in which case SuperJANET is really the only true Superhighway at present in the UK which reflects the fact that across the world the Superhighway concept has evolved out of the public sector academic, defence and other research environments.

Although sheer volume of numeric and character encoded data will demand ever greater bandwidth, the growth of image, multimedia and video transmission is seen as the key factor in the need for the development of a universal superhighway.

Incompatible network standards cause many problems including:

- frailty and failure of interconnection
- unnecessary processing overheads
- slowness of communication
- high development costs
- high training and usage costs
- reduced efficiency and competitiveness
- "locking-in" of customers
- higher risk in decision making.

Typically these incompatibilities arise out of the natural lag between new technological development and wide agreement on standard protocols. There is also a natural and healthy conflict between competitive edge and mutual interest. There is an extent to which the Superhighway itself through its ubiquity and speed of communication imposes *de facto* standards such as World-Wide Web quicker than ever before.

2. WHAT SERVICES ARE BEING PROVIDED

As a University we will answer this question from the point of view of education which in any case involves most of the areas listed. Perhaps the most vaunted applications of the Superhighway to Higher Education is the prospect of Open and Distance Learning in a mass market through the use of high quality multi-media materials delivered, moderated and assessed across the network. It seems probable that in current and future financial climates further efficiencies and massifications in the UK may only be achieved in such a way. It is certain that for the UK to compete in the world-wide education market, particularly in the less favoured regions, UK educational products and services must be developed and brought to market rapidly, as competitors in the English speaking world are already so doing. Examples of the products and services which are being developed or which will be required are:

- high quality multimedia courseware
- electronic mediation and assessment
- electronic registration and payment systems
- copyright management, control and licensing facilities

- authentication
- digital libraries
- image banks and video streaming
- world-wide databanks of UK educational opportunities.

3. WHO WILL SUPPLY?

The development of multi-media products for education requires a fundamentally different funding and investment model from the provision of traditional teaching methods. Multi-media materials are typically one hundred times more expensive to prepare than traditional class materials and costs are front-loaded. These costs must be recovered through scaling up of market penetration via a pervasive high bandwidth network infrastructure. Outside Higher Education institutions this network is not in place. It is hard to see how this investment could be achieved without substantial inward investment by the private sector. Participation will be required by companies in the business of telecommunications, multi-media, imaging, publishing and copyright, electronic financial services and security and authentication services.

At the same time it is worth nothing that the only UK Superhighway, SuperJANET, has been developed by and at the expense of the Higher Education Sector, which had the vision to implement the concept well before it became the talking point it is today. The recent document by the DFEE and the Welsh, Scottish and Northern Ireland Offices "Superhighways for Education" highlights the need for industry and commerce to cooperate with Higher Education in developing products and services. A range of relationships are perfectly feasible. Purely commercial relationships between the private sector and universities, for example, can be set up through University trading companies. De Montfort University operates one such company "De Montfort Expertise" which has been highly successful. Consortia can also be set up which allow private and public sector bodies to cooperate on a non-for-profit basis if appropriate. Finally the work of emerging consortia, such as Smart Isles, which aim to bring together the private and public sectors will play a key role in enabling the private sector to understand the higher education market and allowing the public sector to tap into private sector expertise and investment.

4. UNIVERSAL ACCESS AND THE ROLE OF GOVERNMENT

Key factors here are content, connectivity and the legal framework. It is becoming increasingly understood that whilst the Internet's phenomenal early success has been based on messaging, the product and service development from here on will focus on providing access to content. This point has been famously highlighted by Microsoft procurement of image rights. Britain has immense collections of heritage information and intellectual property on which to base major media business of the future. Government can promote the digitisation of and access to this heritage and intellectual property by supporting key projects and demonstrators. Such projects should always include private sector partners and should be of various sizes in order to attract smaller companies as well as the multi-nationals.

Once content is available wide scale connectivity will be required to provide access. At present access is restricted at high bandwidth to a relatively few users with access to the SuperJanet. Whilst ISDN dial-up will contribute to a certain amount of customer base development, some key demonstrators and projects to develop domestic connectivity would be helpful. These could be of two sorts. The first entails projects to encourage critical mass connectivity in high density areas, possibly connected to urban regeneration projects in inner cities. In such cases limited help to cable companies may be all that is required to develop mass connectivity on the back of entertainment products. Secondly it would be extremely helpful to promote Superhighway projects in low density areas where cable will not penetrate yet the much heralded benefits of the electronic cottage concept offer much in the way of economic development. Such projects would be particularly helpful to higher education, which could not itself fund the infrastructure but which could be helped to provide new services and the extension of mass higher education which will be otherwise extremely difficult to achieve.

Finally, these enabling actions will be of limited utility if the legal framework is not conducive to development. At present the law relating to electronic copyright, particularly that in images, is highly complex leading to high levels of risk for entrepreneurs, public sector and users. Attention should be paid to clarification, simplifications and concepts of fair use. The latter are established in the realm of print, but not in electronic material. Similarly clarification and simplification are required in the area of limitation in matters of libel and unsuitable material. Institutions which take due diligence to implement internal regulation and good practice should be protected from legal action in respect of aberrant behaviour of individuals over whom they have no control.

CONCLUDING STATEMENT

As a regional distributed university with world-wide interests De Montfort University welcomes this opportunity to comment on issues related to the Information Superhighway. It has particular interests in the development of global distance learning business cooperation and has particular expertise and recognition in the fields of networked imaging, multi-media and digital libraries. It has only been possible to address a few issues in this complex area in this response and De Montfort University would be pleased to assist further in the work of the Sub-Committee if required.

Memorandum by the Direct Marketing Association

This submission has been prepared by the New Media Council of the Direct Marketing Association UK. Our focus as a Council is exploring the potential of new media for the responsible commercial development of direct relationships with customers. Our Mission is therefore "to identify and recommend effective means for business to realise this potential and to offer a respected source of expertise in the utilisation of new media to business, industry and government, in order to ensure the trust and confidence of the consumer."

Our responses to the questions posed represent a commercial perspective of this area. However we strongly believe that understanding the wider society and political issues created in the new environment are essential to creating a sound commercial framework. We are happy to respond to further questions or provide more detail to the sub-committee dealing with this topic should it be required.

GENERAL COMMENTS ON THE SUBMISSION

1. *The term "Information Superhighway"*

The term "Information Superhighway" is by consensus of the New Media Council already somewhat passé. More significantly there has never been any generally agreed definition of the term and what it means—with only minority recognition by the public (31 per cent in 1995 according to the Henley Centre). We acknowledge your suggested definition of this enquiry, but find that it is not possible to conceptualise developments as a coherent network.

In this respect the "Information Superhighway" does not currently exist.

The Internet is a network—but there are many other disparate activities developing which are not necessarily part of an existing network, that may eventually prove to be the basis for the future network of networks—such as cable, or digital TV.

It is true that the term Information Superhighway has not been fully superseded by any more widely recognised term, but several were suggested as being more up-to-date and dynamic, including the terms multi-media and new media both of which better accommodate the wide range of technologies currently being developed and trialled. Additionally, the underlying facilities of digitalisation, compression and bandwidth were all felt to be an essential part of creating a genuine network in the future.

2. *The scope of your enquiry*

The questions posed in the invitation were very broad and challenging. We felt that this was a subject that could warrant several months in-depth investigation and analysis—time which is not available. Therefore within the time frame we cannot answer the questions to a conclusive level, but just give you our views based on experience and knowledge of the area of a number of practitioners in electronic communication.

The DMA Research Centre, supported by the New Media Council will be conducting and publishing a substantial programme of original and desk research to start in May 1996, for which it is seeking funding. Entitled *"Responding to the Future"*—it will involve original research into how consumers and small businesses are responding to the new media environment in the UK.

This will provide more in-depth and practical answers than is possible in this initial paper.

3. *It raises fundamental questions about government involvement and the future shape of society than can be simply answered in a paper of this type*

Underlying most of the questions, and therefore emerging as central themes throughout, are two major issues.

- Whether control of development in this area should be left to open market forces (including global competition) or alternatively subject to government intervention and legislative control.
- Inherent in the first, whether it is an area in which government should be making really significant investments to promote and manage the growth to the benefit of UK plc.

We find that points of view on these issues are partly dependent on political orientation and individual world views.

However, as representatives of the DMA UK, which has an unrivalled track record of effective self-regulation of direct marketing (anywhere in the world), we believe that it is possible through strong leadership and industry collaboration to go a long way to devising and implementing commonsense controls without legislation. Indeed it is one of the missions of the New Media Council (set up at the request and with the support of the Advertising Standards Authority) to provide the leadership and direction perceived to be lacking in the burgeoning commercial use of the new media environment.

We are currently supporting the DTI's Information Society Initiative and welcome any government support for developments in this area. We do note, however that the total budget for their activities is in the tens of millions of pounds rather than the hundreds. This leads us to believe that currently the necessary investment to put the UK ahead in the global marketplace will have to be made by the private sector. And that public funds to ensure global leadership will not be forthcoming given continuing pressing economic and social issues facing the UK.

This in itself then creates another question—whether, given financial pressures and chronic short-termism in UK business today (largely the result of a unregulated market environment) the necessary investment can be relied upon from the private sector. Given the investments being made in other parts of Europe (most notably by Deutsche Telekom in cable in Germany) it leaves UK plc in a vulnerable position and potentially likely to be left behind in the race to fully wired status. For this reason, we see the questions being asked in this paper being profoundly important to the future shape of our society and the UK's ability to compete in tomorrow's world.

In other respects, largely due to the early liberalisation of telecoms in the UK (compared with the 1998 deadline set for the EC as a whole) we may be in a better position than some other markets. The competition that has existed in this market has resulted in the lowest telecoms costs and a healthy competitive frame for the race to wiring up UK plc. This has already resulted in the proliferation of service and content providers, specialising in the creative and high quality content for which our advertising and marketing communications heritage has already given us a reputation for already. In this respect we already have an edge that needs nuturing and exploiting.

What is certain from our investigations thus far is that commercial applications are more developed in the UK than public sector services. And whatever the answer for ensuring the most effective commercial development in the UK, we find that in the area of public provision of services and support, the government will have to take responsibility for investing in the development of electronic communications that will be publicly available to the benefit of all citizens.

These general points made, here are our specific responses to your questions. Some we are able to answer in more depth than others at this stage. In recognition of time constraints and for those that wish to speed read our answers, key paragraphs are highlighted in bold.

Q1. *What is the current form of the "Information Superhighway" and how is it developing in the UK and worldwide?*

As noted above there is no single network fitting the definition provided by the brief in the UK or the World. Whilst the Internet is the fastest growing network, with an estimated 500,000 users in the UK, and 30-40 million across the world, there are many others that are developing using different formats, which may eventually overtake the Internet. The Internet was not set up for commercial application and is not accessible in its current form to the majority of people in the UK or indeed the world.

Whilst a tome could be written (and indeed some have already) describing all the current activities in detail including CD-ROM publishing, we would summarise with this list of the significant developments in the UK today:

- interactive TV trials including Video-on-demand in East Anglia run by BT
- on-line shopping services provided by Acorn computers in Cambridgeshire
- Teletext which continues to show increased usage and penetration and is looking to expand bandwidth with expansion into digital TV and thus achieve greater interactivity
- Digital TV-set top boxes providing telecoms based interactivity via the set
- cable television—now in some 5 per cent of UK homes
- increasing penetration of ISDN, broader bandwidth telecoms provision—facilitating transmission of information and pictures
- development of interactive kiosks—taking advantage of ISDN connections now being tested by BT, financial service organisations and retailers.

There is much debate about which technologies will win the battle to provide the basis of widespread electronic interaction in the UK and worldwide.

We find that most of this is argued from a supply side perspective rather than based on understanding the social and cultural factors that determine what will prove to be most attractive to the people who will use the technology

in their homes and at work. Therefore, many previous forecasts for growth look very optimistic, untrammelled by considerations of the barriers that exist to the uptake and use of new technologies.

Social research confirms that the speed of uptake is largely determined by the following factors:

age
gender
income
occupation.

More investment in understanding the demand side factors and the spread and adoption of technology from the workplace into the home should improve the quality and commercial success of future developments. Additionally, in terms of how these technologies can deliver benefits to the older, downmarket and disadvantaged groups in society must surely be the subject for greater research and understanding. In their report "Home Information and Communication Technologies and the Information Society" academics from Sussex University conclude on this point that "those at the margins will find it increasingly hard to gain the resources necessary to access the new technologically driven and increasingly technologically dependent culture". If the information superhighway is going to become a reality for these groups then a conscious decision will have to be made by government.

We believe that anything approaching an information superhighway in the UK is currently only in the most nascent form, and at best reaching some 500,000 people in the UK. Realistic forecasts from the Henley Centre for Forecasting to the year 2000 suggest the following possible penetration levels of the necessary technologies to facilitate widespread electronic information exchange:

	1995	2000
pc plus modem	1 per cent	19 per cent
cable	6 per cent	15 per cent

We note that the UK is behind several of its key competitors in the penetration of these technologies with 35 per cent multimedia pcs estimated by 2000, comapared with 40 per cent in Japan and 56 per cent in the US. (estimates from MTI).

That said, developments across the world are still largely piecemeal and disparate. Even in the States many of the earlier experiments have proven unsuccessful or are on hold despite the apparently favourable conditions that exist. For many consumers the current media environment is sufficient—the demand may simply not exist for more choice.

So, in the UK and worldwide, there is nothing that really fits the definition of the Information Superhighway as a publicly accessible network, nor is it clear to see where it will come from.

At present in the UK, there are a number of experiments and new technologies that could form the basis of a widely accessible network in the future. However, it is impossible to be certain what will become the future standard. The Internet is the focus of current attention since it is the nearest thing that exists to a global network. But there are grave justifiable doubts about its ability to cope with demand for services and delivery of the necessary quality to compete effectively with other more custom-built networks and technologies that will become more widely available in the future.

The DMA is bullish about the future, whatever form the "network of networks" takes—particularly commercial benefits of new media. Despite the lack of a coherent network and low levels of penetration, we believe there is an environment of enterprise and more positive consumer attitudes towards the benefits of direct interaction with companies here in the UK, than exists in the saturated US market.

This has been shown by our research into direct marketing via other media. And we believe, that as we work to establish the framework for responsible use and consumer protection, this will result in the UK becoming an extremely benign environment for commercial tests which can then be rolled out globally. We seek actively to support and foster these developments amongst our member companies—all of whom have the benefit of a direct marketing approach to customer interaction.

Q2. *What services are being provided and should be developed?*

This question in particular could warrant a study in itself. There are many trials and experiments now underway in the UK. Many more established services exist in the US, from which much can be learnt and anticipated despite the very different media and consumer environments that exist. The New Media Council is currently compiling a comprehensive list of activities in this area, as part of the *Responding to the Future* programme, described elsewhere in this paper and can make this available at a later date. We do not think it adds to the value if our response described these in any detail here.

As to what we think should be developed—this is such a complex subject, that we would prefer not to treat it superficially, but produce a measured response with the benefit of further research and analysis.

It is clear from the views expressed in this paper that the success of the many services being developed in the commercial, publishing and entertainment areas will be determined by market uptake and the ability of providers to create customer benefits and make a profit. The biggest challenge is for central and local government with little experience and funding, to effectively find ways to maximise the benefits of the new media environment to the benefit of all citizens. Here there are many "shoulds" but more complex issues need to be addressed.

This needs to be researched in some depth and recommendations made which resolve the issues of technological access and actual content, in the light of prevailing government policy. This is an area in which we believe we can make a significant contribution given our experience of creating and managing direct interaction with people through a range of media and methods.

Q3. *Who will supply these services to consumers in the United Kingdom? How can the participating companies be categorised and what is the nature of the commercial relationships between them? How are suppliers likely to develop? What service standards exist and how are they likely to evolve?*

Again fundamental issues are raised by this question. Dependent on which technologies win out in the battle to become the mass provider of genuinely interactive communications to the consumer, different providers will be favoured. If it is fibre optic cabling, then this would point to the predominantly US-owned cable companies, already making inroads in telecoms and programming provision (although uptake has been far lower than hoped at around 5 per cent of homes passed). If it is to be modem and telecoms-based, then BT with its investment in ISDN coverage can win out, and as the experiments in Ipswich are demonstrating, a high degree of interactivity can be delivered down simple copper wires.

The leaders in provision of commercial on-line services in the UK are American companies such as CompuServe, who like the cable companies, have found European sales initially disappointing, but are now finally beginning to show healthy acceleration. Microsoft's Service Network is showing dramatic growth particularly since the launch of Windows '95 and provision of easy links into the network and through it to the Internet.

It is difficult to see how UK service and network providers other than BT can develop to compete with the clout of these established US giants, with years of experience to bring to the developing European markets. At the same time market conditions in Europe, given the forthcoming 1998 liberalisation of all but a few national telecoms markets, may be giving European telecoms providers an edge over BT who are tightly constrained by Oftel in what they can do.

The free market conditions created here through early liberalisation of telecoms currently appear to favour US cable and service providers and possibly European competitors in developing services for the future. In the interests of UK plc, it would seem to us to make sense to ensure that there is at least an equal playing field for BT and others to develop and compete.

The fast changing environment and attendant risks favour joint ventures in service and content provision to defray the costs and maximise the opportunities for learning. Already the precedent has been set in the commercial arena for collaborations between service and content providers as described above: CompuServe provides access to Tescos Wine Direct service, Selfridges, Dixons, Virgin and PC World. Barclays Bank have invested to create Barclay Square on which Sainsbury, Toys'R'Us, Eurostar, and Sun Alliance can tout for business. Microsoft's network is home to GUS's Shoppers Universe and Tescos. Thomas Cook and NatWest have been collaborating with kiosks. In Canada, one of the most advanced experiments, Videoway, linking 34,000 homes in Quebec is backed by the National Bank of Canada, the Canada Post and Hearst Corporation amongst others.

This need for sharing risk is creating a fluid and flexible environment which we believe is positive in the commercial world, since it encourages more experimentation. At the same time, many of these ventures (as has been shown time and time again in the US) can flounder without clear leadership, vision and importantly investment. Much of this has been blamed on lack of interest from the consumers—but in our view much of this could have been detected and dealt with through better research and development. More investment is needed at this end of implementation.

In terms of service standards—the rapid growth of services is creating uncertainty and confusion. Whilst incompatibility is a diminishing issue with each technological advance, the biggest concern must be in setting standards for service quality. At the moment it is clear that new suppliers are springing up daily in design, web site creation, and site management, who have no established credentials, and companies have no redress if they fail to deliver work to a satisfactory standard.

As in any fast growing area of business, there is the "goldrush phenomenon", something that the direct marketing industry has experienced over the last few years, as the fastest growing area of marketing communications. Now the Internet is taking the torch on as the fastest growing communications method ever known generating unprecedented excitement and possibly unprecedented opportunity for ruthless exploitation of hapless advertisers and companies new to the game.

The DMA's New Media Council will be addressing this issue and developing commonsense recommendations and evaluation techniques to help companies select and choose and judge suppliers. It will also consider ways to provide a register of bona fide suppliers, who as members are controlled by the DMA Authority and underwritten by extensive insurance.

Already, there is a growing body of experience in the commercial sector in the UK, of what makes for good electronic interaction, in terms of download times, involvement devices, fun and frequency with which a site is updated. Much of this is being developed by DMA members and we will articulate and formalise this over the coming months and issue draft guidelines of good practice. Our members will be obliged to abide by these guidelines as they are obliged to do with the other codes of practice developed for telemarketing, direct mail and mail order. In the US the Internet Society has been formed to create a forum for reviewing and setting standards—and we are keen to find out what they have produced thus far. In the UK there is already the ISPA—the Internet Service Providers Association who are creating a valuable forum for discussion and are generously participating in the formation of New Media Council.

The DMA, as we noted above, already has an excellent track record in effective self-policing of its members and setting what have become nationally recognised standards for direct marketing via existing media including the telephone. Its predecessor organisation (the BDMA) set up the Mailing Preference Service and more recently the DMA introduced the Telephone Preference Service, to enable consumers to opt out of cold contact via either medium. It is well placed to take the lead in the new media arena for setting standards for the quality of interaction and trade and intends to take this lead through the New Media Council. Excellent links already exist with the European Community. The Data Protection Registrar and the Home Office as well as the Office of Fair Trading, who see the DMA UK as an authority and early point of consultation in legislative and consumer protection issues arising out of direct interaction.

Q4. *How can access to services provided for the common good be secured within a competitive market framework?*

This question raises again the most profound social issue created by the possibility of the future existence of a real "information superhighway" and that is the increasing exclusion of a significant proportion of the population from the benefits of electronic provision of information and services. We noted above that adoption of new technologies is largely predicted by demographic factors, and that this would point to a significant proportion of the population being excluded unless a policy decision is made to change this trend.

The electronic ghetto

A term recently coined in discussion by Dr Merlin Stone of Surrey and Kingston Universities, the electronic ghetto, describes a new arena for discrimination between rich and poor, the "haves" and the "have nots". Recent years have seen further rapid polarisation between these groups in the UK in terms of income and opportunity, and the coming world of electronic communication presents yet another source of disadvantage. Recent research shows that UK Internet users, like their US counterparts are younger, more upmarket, and more likely to be male.

This has already been identified in relation to the use of smart cards and database technology by Demos who are preparing a study for publication. And the recent DMA/Henley Centre report "Dataculture" identified that consumers are already aware that companies do discriminate on the basis of information they hold on computer. And if a genuine "superhighway" comes into existence, there is a real danger that the poor, unemployed and elderly will be further marginalised in society, unable to either access or benefit from the brave new world faciliated through technology. Judith Hoffman, of OIT (Oxford Information Technology, a subsidiary of Express Newspapers) formerly of the Chicago Tribune group in the US, cited the instance of Chicago City Council posting rubbish collection schedules on the "net" to replace printing these in the local press. Others have cited the "homework service" in the US where schools post the homework schedule so parents can check up on and supervise their children. Immediately the disadvantaged, poor and technologically disenfranchised are unable to benefit from this information.

The spectre of the electronic ghetto is a serious social issue—we believe that it needs to be urgently evaluated by government. The commercial sector cannot be expected to fill the void.

Some suggested routes for addresssing the problem are:

— Provision of public access points via kiosk or telephone boxes.

— Information access could be made available via cable, digital or other TV developments. With 99 per cent household penetration, this technology alone offers the potential of reaching the vast majority of people with public information. However all these forms of interactive TV require the consumer to pay—again excluding the key segments that need to be targeted if universal access is to become a reality.

— The possibility that distribution of the technology will be found by the government seems highly unlikely, although in France Minitel sets have now been distributed to over 10 million homes by the State owned France Telecom, with obvious commercial benefits.

— It may be that Oftel should be encouraged to relax it's control of BT's activities in this area, and allow them to participate in the content provision that will make greater investment in proving the infrastructure financially worthwhile.

The question as to whether people will use technology, even if it is given to them for free is another matter. Perhaps, as we have seen with Teletext, or the provision of Minitel in France (now in over seven million households distributed by France Telecom), it will be the young, more affluent, who will adopt and use the services available—the disenfranchised will continue to exclude themselves due to lack of education or the cost of accessing commercial services. Interestingly, Minitel provides further proof that the market is the ultimate arbiter of what will be attractive and commercial and what will fail. Of the 23,000 commercial services now available only 10 per cent actually make a profit.

Universal access to services on a household basis (as opposed to public kiosks) will occur in the UK only if the government take a policy decision to ensure that it happens or allow a global telecoms business such as BT or a consortium to fund its development in return for commercial benefits.

There is not only this question of access to electronically transmitted information in the future but also one of content. Here, in the public sector we believe the Government has to set a strong lead and ensure that government departments invest in providing appropriate and useful content to citizens, employing the techniques that the commercial sector has developed to maximum participation, involvement, readability and re-use. This leads straight onto the next question.

Q5 *What is the role of central Government in connection with the "Information Superhighway" service provision?*

Again the question raised a number of highly complex topics, which we are fearful of treating lightly.

It should be clear that our view is that certain components of future developments will have to be centrally funded to ensure that the interests of all citizens are protected and that the commercial sector can only benefit from the right kind of investment and support.

Once again, we refer to our initial comments about the role of central government in this arena and the likely influence of a political dimension or viewpoint. In our view real world leadership will need to be created through investment in the infrastructure and most importantly, education of the nation in the use and applications of the technology.

Putting UK commercial interests as the primary concern we will answer from this perspective.

(I) LEADERSHIP

(a) *Commercial*

The DMA New Media Council would like to see greater leadership from the Central Government in ensuring the UK remains competitive in this area. Recapping some of our earlier points, this doesn't mean that the Government should control developments but that it should provide a coherent well-funded framework in which commercial applications can flourish.

This should involve:

- Substantially more funds to support initiatives such as the DTI's Information Society Initiative which can be used to provide genuine seedcorn to collaborations and new initiatives—we would suggest that funds in the region of £350 million over three years are more appropriate to kick starting the future, than £35 million, most of which is spent on promotion rather than advice and hands on assistance.
- More active involvement of commercial organisations and associations who are seen as leaders in this area in the formulation and implementation of such initiatives—either on secondment from market leaders in the US or the UK, or as a steering group.
- Provision of practical guidelines and support for Government funded bodies like Business Links to help small businesses benefit from the new environment (precise nature and form to be decided by the steering group described above).

(b) *Public sector*

As we have already indicated, we believe that there should be much greater active leadership by the Government in identifying applications and implementing them in the Public Sector. We are aware of the recently formulated New Ministerial Group on IT, but feel that the most important requirement is to blend the top level policy making with practical commercial experience in this area, in a co-ordinated and funded programme to make sure that developments have the benefit of the entrepreneurial spirit in which we excel, and are not weighed down by (however well intentioned) bureaucracy:

- there should be a central co-ordinating group, that has formal links with the Commerical Steering Group to provide an overall framework, practical advice and access to commercial expertise to the Government departments;

— more important is that a policy is formulated on what kinds of services will be provided, how they can be made more widely accessible for the common good;

— individual Ministries will necessarily need to develop the precise services and applications, but the framework will ensure that these do not get duplicated, they are of the highest technical and creative standards to maximise effectiveness, and that through this co-ordination, the UK is seen as leading the world in public sector developments.

In this respect, it may be possible to quickly leapfrog even the US where there are many more developments in this area. But they are largely piecemeal and not coherent or consistent. The social issues raised by the "electronic ghetto" have not been dealt with through a national programme.

We believe that if the UK government takes the lead now and invests in using the existing expertise in commerce to advise and guide on the public sector developments and ensure effective co-ordination where possible then a real competitive advantage could be gained for the UK as a whole.

This overall point provides an umbrella answer to the other areas you have asked for specific comments on. We deal with these more briefly.

(II) PROMOTING INWARD INVESTMENT:

Whatever forms the basis of the future "information superhighway" it will undoubtedly become a global phenomenom. Thus the concept of inward investment in this area is not one of just the physical location of web sites or telecoms networks, but of maximising investment in expertise and creativity. As the UK marketing communications industry leads the world in creativity and quality, we should be well placed to take this lead and develop it in the new media environment.

It may prove to be one area in which we can sustain a clear international competitive edge and that whilst other countries can process the electronic communications, the UK will be pre-eminent in content design and top quality creation.

We would recommend that the DTI forms a task force with the appropriate industry bodies in this area, (DMA, IPA, AA, SPCA, IPR) to formulate a programme to merchandise the UK talents and lead in this area (if it hasn't already).

(III) PROMOTING AND SAFEGUARDING THE INTERESTS OF UK FIRMS WORLDWIDE

The Government should ensure that the UK benefits fully from all the appropriate international fora for developments in this area, including the EC, OECD, G7, Gatt. Participation is not enough. Claiming leadership in the global arena will be based on a clear and compelling vision (developed through the initiatives described above).

Most importantly now the Government must do its utmost to ensure that the extensive research funds that are being invested by all these bodies in the future of this area find their way into the UK and to UK firms.

In this way we can build a body of knowledge and further expertise. At the moment, this is a fairly haphazard process and it is those firms who know the ropes who get the business, rather than jobs going to the right suppliers. There should be a system whereby UK consultancies, firms and industry associations get advance warning of the opportunities and links are established with suitable EC partners.

(IV) NETWORK COMPATIBILITY

Back to opening comments. If it is not clear what the "information superhighway" network is going to be based on, and there are currently widely differing technologies creating the collective "new media" environment, it is difficult to say what the protocol will or should be.

However, it is clear that all those investing in this area should be encouraged to maximise opportunities to achieve compatibility between systems, countries and telecoms networks rather than attempting to sell proprietary and exclusive systems through which they hope to achieve commercial dominance. This is not in anyone's interests.

Competition should ensure low prices and excellent service in this area as it has with telecoms liberalisation in the UK and US. Therefore it can be argued that healthy competition between networks and services should be encouraged to make universal and cheap access more feasible. However this should not be at the expense of network compatibility. A case in point is in the mobile telecoms market, where Europe is now adopting the GSM protocol—entirely incompatible with that in the US, effectively creating a barrier to the development of a global mobile communications network. This kind of situation should be avoided.

(v) ACCESS TO GOVERNMENT INFORMATION

Again, there could be political dimension to this question. We believe that the Government should lead the way in using the technology to provide useful information to citizens. However, this doesn't mean that all information needs to be available to all the people all the time. There is no benefit in quantity in providing electronic data for its own sake.

It also raises questions of confidentiality, data protection and protection of national interests, which in themselves could be the subject of another paper.

However, in the interests of open and democratic government, it would seem sensible for the Government to look at ways in which government information can be made readily available to those that are interested, whilst protecting the rights of citizens and making sure that this information is not abused or exploited.

(vi) SECURITY OF PAYMENT

One of the current barriers to development of home shopping and most particularly banking on the Internet is concern with security on this network (not, as we have noted, necessarily the model for the future). Interestingly, in the US, where excellent encryption software has been developed by the Government to protect military information on the network, there is a ban on exporting this software since it is seen as crucial to protecting state security. Whilst this is something of a "cold war" hangover, it should sound an alarm bell against the government owning such initiatives in the UK.

However, an argument could be made for Government investment in this area, maybe through the newly launched Research Councils, now linked into the DTI to ensure that a commonly available and effective encryption system is developed for UK firms to use, and then perhaps to sell across the world.

(vii) DATA PROTECTION, CONFIDENTIALITY AND CENSORSHIP

We believe that so long as strong leadership is established and effective self policing mechanisms set up for responsible development of new media, to a large degree the need for direct government intervention should be bypassed.

In our recent study Dataculture (published with the Henley Centre) consumer research showed that 80 per cent of consumers are currently willing to give information about themselves to companies in exchange for certain benefits or where they recognise they have to (for example for financial services provision). There is widespread awareness of data protection legislation although less confidence in its adherence. The study concluded that the basic principles of the Data Protection Act are sound and represent what consumers want in this area: namely transparency of purpose. There is no evidence of widespread consumer crisis of confidence, although the balance is fragile and needs to be maintained by the highest standards of behaviour and embracing the spirit of data protection legislation.

The new media environment raises some new questions in this area because much of the data created about an individual's interaction will not be consciously given, as it is when filling in an application form, or over a phone call. Therefore, as part of our mission as the New Media Council, we will be addressing this in our guidelines for good practice.

As far as Censorship goes, it is clear again that a practical commonsense method of self policing and monitoring needs to be established. Given the fact that the distribution of pornographic material is already taking place it must be a matter of some concern, particularly with the accessibility of the Internet to young people and children. The fact that the Playboy site may be the most visited world-wide web site with over one million accesses in a 24 hour period suggest the appeal of this type of material in this essentially private medium.

We cannot condone the stance adopted by America On-line who regularly monitor and censor all pages they carry resulting in embarrassing deletions, such as the word "breast" from the pages of the women's Breast Cancer self help group!

We would recommend that the Home Office brings together a policy formulating group from the established media control agencies—ITC, ASA, and associations like our own, and the Press Complaints Commission, with representatives from the Board of Film Censors to debate and find answers to this potential problem that do not require draconian legislation or unnecessary infringements of civil liberties.

(viii) VERIFICATION OF INFORMATION

Similarly this area could be addressed by the same groupings. **If we take the attitude that new electronic environment is effectively a collection of new media and communications methods, then it should be treated in the same way as existing media and communications.**

Thus the ITC, ASA, DMA, and relevant consumer protection bodies such as SOCAP, need to be involved together in finding a commonsense and workable self-regulatory solution ensuring that electronic content is "decent, honest and truthful".

Whilst the global nature of the communications networks that exist create extraordinary environment for the creation and consumption of these new media, this should not be a signal for panic—a measured, informed and practical approach is needed.

Q6. *What is the role of local and regional government in this area?*

There should be considerable potential for local and regional government to harness new media so as to achieve their statutory and strategic goals.

Again this should be done within an established framework to maximise compatibility, ensure equality of opportunity and to maximise the economic prosperity of every region in the country. The potential of technology to transform a region is well demonstrated by Singapore's Intelligent Island 2000 strategy and investment.

However, it will not necessarily be in the interests of UK plc as a whole if development results in competing city states. Whilst regional conditions will be more important in future, and this will be reflected in the areas that are best equipped to exploit and provide services on the "superhighway" (ie through more professional and managerial workers) there should be a balancing and policy formulation role for central government.

As noted above so long as common access can be achieved through sufficient investment and education, there could be significant benefits from the "electronic town hall" as conceived in Ross Perot's 1992 election campaign; citizens who are constantly in touch and influencing decisions, able to access information and services at the touch of the button. This is an attractive vision. It will not happen by accident. Sharing experience and knowledge will be critical as forays are made in this area. At present, if we look at the quality and range of telephone services provided, it is up to initiative and determination within particular boroughs or regions—the result is extreme variation and patchiness. In an area that determines the ability of all citizens and workers to participate and compete in a global marketplace, huge variations in levels of accessibility and service should be avoided.

It is worth noting that in the area of local information, there is some potential for competition between local government and local publishing ventures via electronic media—since much of what the town hall might wish to post on its sites would overlap with material more traditionally covered in the local press (opening times etc).

Q7. *What will be the impact of the "Information Superhighway" on working practices and employment prospects?*

The world of work is already transformed beyond recognition by computers, the telephone and the decades of decline of the UK's manufacturing base.

With one of the most dynamic and fast growing service sectors in Europe, we are well poised to adapt and compete for work in the new, electronically facilitated environment, whatever form that takes. The requirement is to understand these trends and invest, prepare and exploit them to the benefit of the UK workforce as appropriate. A judicious mix of government foresight and planning with legendary UK enterprise will achieve the best results.

The key trends that are already well documented, will be accelerated and more significant are:

- downsizing with attendant growth in contracting out
- new work will be contract based and less secure—telecoms and technology will be essential for firms and individuals to compete for work
- huge growth of employment in smaller firms (50 per cent by year 2000 in firms of less than 50 employees)
- flatter organisations and new project/team working practices facilitated by communications
- technology allows teams to come together remotely and work effectively at a distance
- more flexibility in working practices will come, with greater degrees of teleworking and operating on the move for all service/professional workers
- a premium on the ability to find and process information—expertise will be critical in the world of "knowledge workers" of the future
- feminisation of the workplace—more women, in flexible working arrangements or part time work, will change gender roles even more
- individuals with the requisite knowledge, computer and telecoms links will be able to get work from anywhere in the world—as described by John Naisbitt's book—the Global Paradox.

We will be reporting on this later in the year, particularly in respect to the operation of small firms and "SOHOs" (small office, home office).

Additionally, it is interesting to consider the changes that may well take place in the public sector working methods and employment. Medicine is an obvious and much discussed area. Teaching another. But the full impact could be considerable in many areas of the civil service. Already there has been much down-sizing and re-location. Flexible working practices have already been adopted by many departments. More will certainly follow as employees are able to live and work at a distance.

Q8. *Is the dominance of mass-market US software a threat or an opportunity?*

Without time for in-depth consideration of this question the immediate reaction is that this is not really an issue. Due to the earlier development of the Internet and many of the other interactive technologies in the US, it is no surprise that US companies are leading the way in the technological underpinning of the new media.

However, in our view it is content and application that is critical not the technology. We believe that the UK can be more creative and innovative in both content and applications than any of our competitors internationally, and will become recognised and in demand for these skills.

The investment required to develop products to effectively compete with Miscrosoft or Netscape is beyond the resources of most organisations nor is it clear that there is either a market or a need for such products.

Focus on content and quality is the key to creating the UK based competitive edge.

THE DMA NEW MEDIA COUNCIL

We have highlighted that we will be very active over the coming months in developing good practice guidelines, draft codes of practice and undertaking studies and issuing reports on this area.

Please contact us for more information on any of these activities. Additionally we would be most grateful to hear of any new ventures or developments that you are aware of that seem to be relevant to our mission and area of interest.

Letter from Dow Jones Telerate Ltd

Due to travel abroad I have only seen your letter today and therefore have no opportunity to reply in detail before the Committee starts its investigations.

Dow Jones Telerate is an international company in the Financial News and Information markets, serving the international business community and specifically the major Banks and financial institutions, whose requirements put them very much at the top end of the information business for real-time on-line services. In this respect we compete with Reuters for example.

This does not mean that we have no interest in the broader information superhighways, as they are now called, and have already been involved with the EEC in their superhighway investigations. In fact, I attach the written evidence that we made to the EEC on these matters in 1994, though clearly it answers different questions.

I will be out of the country now till mid-February, but if there is still value in submitting a formal reply to the Committee at the end February for example, I would be pleased to do so.

Martin B. Church
Senior Managing Director

29 January 1996

COPYRIGHT AND RELATED RIGHTS IN THE INFORMATION SOCIETY

Response of Dow Jones Telerate Limited to Questionnaire dated 2 June 1994

(1) EVOLUTION OF THE "SUPERHIGHWAYS"

(1a) *Are developments of products and services on the "superhighways" to be considered as a process of radical change or of evolution?*

We consider, for reasons set out below, that such developments will be a process of a selective evolution and not radical change. This evolution will encompass certain products that have broad consumer appeal.

(1b) *If the changes are radical, are they quantitative, qualitative or some other form of change?*

We consider that the changes will not be radical and that the question is not applicable.

(1c) *If the changes are evolutionary, what direction are they likely to take and for which products and services?*

We consider that most of the products and services carried on the "superhighways" are likely to be those that possess consumer rather than professional appeal. In our own business which consists of the provision of business and financial news and information, some products of professional appeal could well use "superhighways" as a means of access as long as strict control and permissioning were available. These typically could be:

(i) products that allow the retrieval of historic items of news, where such consist of database type text services;

(ii) non-real-time summaries of market prices and other general data;

(iii) business TV;

(iv) non-proprietary real-time databases to drive customers' value-added applications

It is not beyond possibility that full real-time proprietary services could be accessed via "superhighways". However, we consider that professional users will still want to access these via dedicated circuits as they do at the present time. This is because we believe that such professional users will want to maintain direct telecommunications connections with the information suppliers via private leased lines. Having said that, "superhighways" could be used to access conventional real-time services in back-up mode.

If a customer wished to access our real-time services via the "superhighways", and they were available on that distribution mechanism, we would charge such customers the same price as for receipt of our information by any other means. The cost of delivery in our business is normally met by the customer, who would of course have to pay "superhighway" charges.

(1d) *Do the changes relate to new ways to distribute and use products/services or to new products/services per se?*

We consider that the changes relate to new ways to distribute existing products or services or segments/subsets of the same.

(1e) *What time scale do you anticipate for such changes to take effect?*

We believe that the changes could be implemented as quickly as the software needed to distribute, permission and control the proposed products could be completed.

(1f) *Do you consider that one sector of users more than another is likely to make the greatest use of "superhighways"? If so, which sector (ex government, business, education, entertainment)?*

We have indicated the types of products likely to be carried on the "superhighways". We have no opinion as to whether such products are likely to be of more use or interest to any possible classes of users other than our general comment earlier that professional users are likely to make limited use of a medium that is not dedicated to their specific requirements where information is of fundamental importance to their businesses.

(2) SCOPE OF SUBJECT

(2a) *Should the concept of information infrastructure be limited to digital fixations and transmissions?*

We consider that this should not necessarily be the case. Including analogue modes of fixation and transmission would broaden the appeal of the "superhighways" because existing analogue products and services could participate immediately.

(2b) *If so, will the possible existence of different legal regimes for analogue and digital versions of the same products and services create problems?*

Different legal regimes for digital and analogue services would certainly create problems, as they would do if different regimes applied today. This is because customers can today receive both transmission types depending on their usage patterns, ie (in the case of financial data) whether they wish to receive a video display of fixed pages of data from which only snapshots can be extracted, or whether they wish to use a digital stream of data that can be manipulated to their specific requirements.

(2c) *If not, should all products and services be considered as an integral part of the information "superhighway" regardless of the technology used for their fixation/transmission?*

Yes.

(2d) *Should the same rules apply to products and services which are distributed in the form of physical copies and those which are distributed on-line?*

Products with identical content should be protected in the same way regardless of the mode of delivery. In particular, data in digital form can be easily copied without error, which increases the need for protection against piracy and overuse.

(2e) *Are there any issues specific to the creation of "multimedia" products and services which justify a wider treatment of "multimedia" going beyond the context of the information infrastructure?*

A multimedia product can be expected to contain different elements each of which will be protected by copyright. It may be that the possibilty of cross-references between media will create new problems of permissioning and enforcement of restrictions on use of the subject matter in a different form. The fact that multimedia could increase opportunities and incentives for unauthorized use of data or works should not, however, be used as an argument to reduce protection so as to facilitate access for multimedia purposes, since that may reduce the incentive to create new original works or collect data.

(3) IDENTIFICATION AND CLEARANCE OF RIGHTS

(3a) *Do you consider that products and services should carry some identification of intellectual property rights?*

Yes, we consider it essential that it should be possible for right-holders to identify their intellectual property if they so choose. It should be left to the copyright owner to decide whether to do so.

(3b) *Should such an identification system be accompanied by a voluntary deposit or registration system?*

This may be useful for evidential purposes and to facilitate the clearance of rights, but should not be compulsory and for some services would be impractical. Therefore it is important that non-deposit not be construed as a waiver or weakening of a claim to copyright.

(3c) *Should any identification/registration system be part of an "automated" copyright clearance system?*

We believe that this may be useful for certain services of some suppliers, provided this is on a voluntary basis. It is unlikely to be of use to services such as those provided by Dow Jones Telerate where individual subscriptions are required. The protection in such cases arises from the fact that the supplier authorises individual access to services that it wants to protect.

(3d) *Should non-voluntary collective administration of rights be used to facilitate the clearance of rights for digital multimedia products?*

No, this will definitely not be acceptable to suppliers of certain services that might otherwise participate in the "superhighways". Suppliers must have the right to decide if collective administration of rights is an efficient way to exploit their intellectual property rights. Over-regulation may well give rise to market distortions.

(3e) *Is there a need to review the function of collecting societies in the information infrastructure environment?*

This need may possibly arise in the future, but the market, and the individual right-owners, should decide if collecting societies or automated clearance is more useful than the normal practice of contracting with, and collecting from, the end-users directly.

(4) CHOICE OF LEGAL REGIME

(4a) *Do you consider that existing copyright/neighbouring rights regimes alone can regulate the information infrastructure environment?*

We consider that the existing rights would be adequate if the level of originality is not set at such a high standard that protection is denied to valuable works. If an "English" level of originality is applied (essentially where a work has not been copied) then this should be sufficient in this technological and high volume environment. If, however, the level of originality is raised to require a certain quality, aesthetic level, innovation, or non-obviousness, then other forms of protection would be required to protect the investment in information or works that would be carried on the "superhighways". Protection of investment is of particular importance in the commercial area, where innovation or creation is driven mainly by the possibility of obtaining a return on investment.

(4b) *If not, what elements require protection which fall outside copyright/neighbouring rights (eg investment, security of systems)?*

If a higher level of originality is required then further protections would be needed. This would be particularly the case if it was possible for people other than paying subscribers to gain access to the materials of suppliers. As indicated, this protection is needed primarily to protect the investment of suppliers and therefore ensure a high degree of quality of materials contained on the "superhighways". If it is possible for third parties to utilise the investment of others free of charge, then this would obviously discourage investment and also provide no incentive for such third parties to create something new and different. Encryption will not be of assistance in increasing the level of copyright protection, where such protection is otherwise denied. It is possible that encryption could reduce the misappropriation of the information of other suppliers, but this would only be a further assurance that unauthorised people did not access such information, and if authorisation is properly controlled this will not be required. Encryption does not guarantee absence of unauthorized access and could, moreover, be circumvented. The availability of a particular technical means to reduce risks of unauthorized access should not, therefore, be a reason not to protect creative effort or investment in the collection of data.

(4c) *If you do not favour the creation of sui generis regimes are you in favour of extending the category "neighbouring rights" ad infinitum?*

We are strongly in favour of extending the definition of created works that can fall within copyright protection because this ensures that such works are automatically protected under the Berne Convention in accordance with the local laws of a country. *Sui generis* rights, of their nature, are not recognised internationally and may therefore, give rise to trade disputes and claims of reciprocity that result in discrimination and thus distort competition.

(4d) *Are there limits to the notions of "copyright" and "neighbouring" or "related" rights which would prevent the inclusion of new subject matter into existing categories or the granting of new rights?*

The specific requirements of the Berne Convention are very broad, in that there has to be a "work", which is an "expression" of an idea. We consider that the optional requirement under the Berne Convention for this expression to be subject to "fixation" is not necessarily appropriate to digital transmissions, which are inherently fast changing expressions of ideas, but nonetheless should be entitled to protection against copying and thus misappropriation of investment. It should be kept in mind that the Berne Convention provides minimum rules of protection and does not require originality in the form of qualitative, quantitative, aesthetic or intellectual contribution. The Berne Convention therefore does not preclude protection of investment.

(5) Review of Existing Regimes

(5a) *Which aspects of either the principles of definitions of existing copyright and neighbouring rights would require to be adjusted to fit the new information society environment?*

As indicated above, we believe that originality should not be set at too high a level in determining the eligibility for copyright protection. If it is set too high, suppliers will have to protect their investment in other ways. It is particularly important that re-publication and distribution of information is not left unprotected. In certain legal regimes it is not an infringement of the rights of the copyright owner to distribute copyright works provided that such distribution can take place without copying. Such a situation would be entirely inappropriate to the information carried by the "superhighways". A distribution right should therefore be created, in the form of an exclusive right to authorise or prohibit the dissemination to the public of protected works or data.

In addition, suppliers should have the right to control the number of copies made of all or part of their information or services. It is important to reserve to the copyright owner the right to specify the number of copies that may be made of such owner's work, because the owner has the right to charge by reference to the intensity of use made by the end user.

(5b) *Should any such changes be brought about piecemeal by amending existing texts or by new laws regulating IPRs throughout the entire information infrastructure?*

We consider that changes should not be made except to ensure a high level of protection throughout the Member States of the European Union. It is enough to amend existing texts.

(5c) *Which aspects of any adjustment or regulation do you regard as most urgent?*

We consider that it is urgent to protect the rights of suppliers of data which, while costly to collect and cheap to re-distribute without authority, may not qualify for copyright protection for each individual item of data. We therefore consider that the draft directive on the legal protection of databases, insofar as it protects against unfair extraction, correctly identified a need in the developing information industries.

Advocate General Gulmann in his opinion on Joined Cases C-241/91 P and C-242/91 P pointed out (at page I-7) that all Member States of the European Union "have entered into international commitments to give copyright owners sufficient protection in order to ensure an appropriate framework for their creative efforts and in their copyright legislation have given copyright owners the exclusive right to exploit the protected work." Furthermore at page I-31 he endorses the concept of ensuring a reward for creative effort. The expectation of reward for creative effort and investment is the incentive to create and innovate. The continuing expansion and improvement of the "superhighway" infrastructure itself and the improvement of services and data provided on the network, can be ensured only be rewarding creation and innovation. Thus, all creators of works protected under the Berne Convention should continue to have the right to use and exploit their works in a manner consistent with its fair commercial value, free from compulsory licensing and, above all, free from unauthorised re-utilisation. Therefore in setting up a "superhighway" for Europe care must be taken to ensure that Member States continue to respect existing international obligations.

(5d) *Is an international regulation of any of these issues desirable?*

We think it is desirable that each country and its citizens should have access to "superhighways" on an equal basis. Inadequate IPR protection "reduces the free flow of works and data, because owners will be discouraged from authorising transfer to countries without adequate protection. For this reason the Commission should continue its efforts to obtain a worldwide minimum level of protection of Intellectual Property Rights.

(6) OTHER ISSUES

We consider that our concerns, which we believe are relevant to other information publishers, have been addressed in the answers given above.

Letter from the Economic & Social Research Council (ESRC)

With regard to the new enquiry into the Information Superhighway: Applications in Society, I have pleasure in enclosing two documents that I hope will provide the committee with relevant information and analysis.

The first has been produced by Professor Robin Mansell, Head of the Centre for Information and Communication Technologies, Sussex University. The second is a policy paper produced by ESRC's PICT Research Programme (*not printed*).

Please let me know if I can be of further assistance. I should say that ESRC considers the area of communication and new technology a priority for social and economic research. One of Council's priority themes concerns this subject, and the Council funds substantial research in the area. It will, in addition, be considering setting up a major new programme on social impacts of new electronic technologies later this year.

Peter Linthwaite
Head of Policy

7 February 1996

Memorandum by ESRC

There are some missing social considerations which are only indirectly raised by the Committee's questions. These might include, for example,

- There are many different kinds of computer mediated communities which will use the Information Highway. Each of these create or constrain different kinds of social relations. Which are to be encouraged? How are these different kinds of relations best encouraged?
- To what degree are these communities constrained by gender, class, ethnicity, and infrastructure access?
- What resources to different communities need to have in order to maintain their participation in computer mediated communities once the initial access conditions have been established?
- How can or should electronic communities participate in the democratic process?

— What are the implications of the increasing home-centredness of activity (ie education, work, entertainment, consumer purchasing)? Is this a viable or a welcome trend? If not, what are the economic considerations that may be overlooked by information service suppliers?

1. *Form, compatibility standards and their importance.* The Information Highway (IH) is developing into a hybrid mix of technological software and hardware based "substructures" and applications which no longer recognise clear distinctions between "public" and "private" networks. This is the predominant trend in the United Kingdom and other countries that are well along the liberalisation path and will likely become the pattern in those which follow. The merging of traditionally distinct networks raises problems of compatibility and the need for gateway standards for existing applications. While variety in standards can generate innovation and experimentation in applications, there is growing recognition that there are some areas where the gains of variety are outweighed by the need to build up a critical mass of users. There is little agreement as to exactly where these points are from a technical point of view, but growing agreement that compatibility from the end-user point of view is an essential characteristic. In the US, recently, a strong case has been made for compatibility standards for "universal e-mail access" for example and for related applications which will enable all users (residential and business) to become participants in electronic commerce and social electronic networks (ie virtual communities). Where suppliers are adopting open interface standards, this means that innovative measures must be taken to differentiate products with software and enhancements above the standard baseline requirements for service. The US is generally agreed to be far ahead of other countries in experimenting with this kind of differentiation. Some describe the current period as one in which there are several "windows of differentiation" that could take hold.

[For your interest, there is an excellent report on "Universal Access to E-Mail: Feasibility and Societal Implications by R H Anderson et al, RAND, 1995. Accessible via http://www.rand.org/. Geared to US developments it points to major issues in the technical, economic, social and political areas.]

2. *What services?* The service possibilities are endless! The most important issues here are the conditions under which incentives are created for their development. For commercial and public services pricing of access is one of the key issues. For example, for a basket of 30 hours per month of "dial up" Internet access (ie public switched telecommunications network plus Internet Access Provider charges), seven of eight countries with infrastructure competition are below the OECD average cost. The UK ranks in about the middle of the range of these countries. Content/commerce companies are only beginning to define initial pricing and business models. One of the biggest areas to watch is the development of network based advertising. Consumers will receive certain content for "free", other content would be paid for by subscriptions. Information providers and transaction services companies will pay on-line services or Internet Access Companies, money every time they point their members to a Web Site or transaction area. This is a long term development but it raises many issues about the role of public service types of information and whether it remains "free".

It should be noted that the growing emphasis on *access* to networks and information runs directly counter to the experience of the on-line information service mode which provides a rich (though limited) set of resources and a high-quality subscriber base. The access model is encouraging content providers to create their own Internet sites, but at present there is no effective way to bill for access—all these sites are money losers at present.

Another critical issue area is the application of copyright legislation and the environment in which users are able to experiment with and reuse information sources. The predominant trend is towards the strengthening of electronic intellectual property rights regimes. However, there is growing debate about the use of encryption/security technical measures and their viability. There also continues to be much debate about the quality of information vs cost trade-off and this is particularly relevant for social applications.

One way of classifying services which has been useful in our work is attached. The specific applications in each category are numerous.

[You might note that the OECD has recently pointed to the need for a radical re-thinking of how existing telephony and data service price structures influence user preferences for different types of services. See OECD, "Information Infrastructure Convergence and Pricing: The Internet", DSTI/ICCP/TISP(95)14, December.]

3. *Who will supply?* There is growing recognition of trends toward the consolidation (vertical and horizontal) world wide of Software producers and Internet Access Providers, content producers and "carriers" in the cable and telephony domains.

Strategic alliance activity is always difficult to predict, but a general trend is toward bundling of features to present a package of applications and features to the user. Those who create the most attractive bundles are also those who tend to operate on the largest scale and are thus able to offer attractive pricing packages. The evidence for this is already apparent in the electronic information services market for existing applications and is likely to grow as a practice.

[A study we completed for the DTI in 1994 showed the overwhelming predominance of US based suppliers of on-line services content in a number of business segments.] There is considerable danger that these trends toward the packaging of all kinds of entertainment/business/educational information products will put the

US companies in the forefront. Changing this scenario for the UK (and Europe as a whole) will require a very radical rethinking of how to stimulate demand.]

There are many ways of categorising participating companies. The best way really depends on what kind of patterns one wants to monitor. At present the statistical base for accurately monitoring industrial activity in the information and communication services area makes it difficult to use other than the standard industrial classification system. Market projections are notoriously unreliable in this area. There are interesting initiatives underway in the OECD area and by the EU but these will take time to come to fruition. What is desperately needed in incentives to industrial associations to collaborate with academics to create usable, ongoing datasets which enable the continuous monitoring of industrial activity in this area. Most initiatives have been short-term one-off studies.

The issue of supplier evolution and standards is highly complex. One approach which we are implementing in the EU context is to develop a method of monitoring the relative maturity of the different components of the "Information Highway" environment. In the early 1980s SPRU developed a way of monitoring the trajectories of microelectronics applications. We are beginning the process of building a methodology to monitor trajectories of evolution of service applications. This will cover technical domains as well as organisational (industry structure) and social, regulatory and other policy domains.

Convergence of technologies and markets are two key themes that need to be recognised by public policy makers and the institutions which device and implement policy.

[The first iteration of this work will be complete in April 1996.]

4. *Universal Access*

Available statistical evidence (weak as it is) points to the fact that despite the fact that the "gap" between those who have access to electronic information of all kinds and those who do not is growing. This is a very difficult set of issues and the traditional focus on universal telephony which characterises the telecommunication regulatory environment is likely to be come less and less appropriate. In a competitive environment with multiple network access providers and service providers it is likely to be impossible to impose on them an obligation to bear substantial costs of universal access however it is defined in the future. This means there will be a role for a degree of public spending—the question is how much and how will this be justified?

5. *Role of Government.* Government has a role to play in all the listed areas. It has an additional role to play in ensuring that the policy and regulatory institutions of the present day change in both structure and remit to address an increasingly cross-sectoral range of issues. Segmenting content/carriage; broadcast/cable and telecoms, etc is not likely to be viable for much longer. One of the perhaps most influential areas that government can play a role in is in all facets of public procurement by electronic means. The other critical area is in the education field and especially in matching aspirations for "life long learning" enhanced by use of information highway based services to the real costs to individuals of engaging in such learning activities. Encouraging the private sector to recognise that there are numerous and very real hidden costs is also important.

6. *Role of Local and Regional Government.* An increasing number of case studies show that many viable information highway applications are successful because they emerge out of regional or local community needs. "Virtual communities" are not always distant communities. They are frequently enhancements to already existing geographically close communities. Facilitating experimentation and adapting initiatives to local circumstances is a key role for local and regional government.

7. *Employment and Working Practices.* Again, a massive area. Studies are mixed. The skills and capabilities needed to engage in electronic environments learned at home and on the job are critical. There is growing concern about the use of electronic services for monitoring employees and their working practices and this issue will need to be continuously addressed. The recent literature on changing working practices suggests that various forms of teleworking are unlikely to grow significantly in the absence of major and widespread adjustments in lifestyles, support services, etc. The experience in terms of employment trends is mixed and continues to be uncertain. The retraining of workers who are unable to adjust quickly to the new demands of electronic commerce, electronic design of products and services, etc is not taking place quickly enough.

8. *Dominance of mass-market US software?* This seems set to continue. The successor to RACE (ACTS—Advanced Communications Technologies and Services) and the Telematics programme is stimulating new collaborations and a host of trials and applications some of which are targeted at software. However, these are not large scale developments and for the most part do not target the package market. Many of the initiatives have counterparts in the US which are already undergoing commercial trials or have been commercialised. "Hard commercial initiatives" will continue to be responsive to demand—again the single major barrier here is likely to remain the access pricing structure.

Memorandum by the European Communications Network (ECN)

PREFACE

General comment

We agree with your definition of Information Superhighways and believe that the most pertinent part of the definition is "publicly accessible networks."

This preface is divided into two parts prior to specific answers to the listed questions.

(1) Technical infrastructure—the publicly accessible network.

(2) Access to the Superhighway and the Customer—What is carried, who makes it, who owns it and how the public (as defined) access and pay for it.

PART ONE

Technical Infrastructure—the Publicly Accessible Network

The main issue surrounding the technical infrastructure is that of the "road block", the "log jam" on the superhighway, in other words, the local loop. Long distance traffic is not, and will continue not, to be an issue.

The problems for the legislators, regulators and operators are the first and last mile of any information's journey. Sending vast quantities of data/video/image through British Telecom's, Mercury's and Energis's fibre optic long distance networks is manageable and straightforward, but getting onto that "super" network is a major technical and political issue. BTs local network is, with the exception of city business centres, not robust enough to carry large quantities of high speed broadband services—data and video. It is old, limited in capacity and to some degree—unreliable. You will have experienced accessing the Internet and down loading data—it is a long drawn out affair.

The Cable companies are currently building fibre close to the home (150 yards) in residential/suburban areas—they are looking into usage and applications on their networks and the use of coaxial modems—but they are not there yet!!—They have passed approximately 5.5 million homes in the UK—only 20 per cent of the population.

Co-axial cable—is much more robust in a consumer environment than fibre or twisted pair, it can carry more information to and from the customer (interactive) and it is manufactured in the UK 50 per cent (BICC) and Europe 50 per cent (Pirelli). In UK urban areas fibre to the kerb and co-axial cable to the home is the industry norm and is being replicated across the world. There have been world-wide trials, tests, experiments with ADSL technology which demands very expensive equipment at the operator centre (Head end or switch) and very expensive equipment in the home or business, but the downside is the poor quality telephone lines upon which the information, image, video is delivered. State of the art at either end—state of the ark in the middle. Most if not all have been abandoned (BT are still working on a trial in the Ipswich/Colchester area).

There have been trials around the world taking fibre to the home, most, if not all have concluded that fibre to the home, is probably a thousand times more powerful than the home will ever need. Also, fibre will not carry electrical current. In other words a perfect digital transmission, clear clean signal connection, but the phone will not ring as there is no electrical power on the line to make it do so. Fibre is not a robust product to put into the home, whilst coaxial cable will handle all that the home could possibly need for at least the next 10–15 years, if not longer.

This is not true of the small/medium sized business, the future major users (along with multinational corporate customers), of the superhighway. Every business simply wants, in some way, to take in vast quantities of information in many different forms, manipulate it, then sell it on. For that they need broadband interactive networks (superhighways) and due to the volumes of traffic generated, they will need fibre-optic broadband networks running straight into their buildings, into their offices and in many cases, straight to their desks, eg the dealers in banks and financial institutions.

The final issue that has to be addressed is whether the UK should accept the fact that with current networks (BT, Mercury, Energis, NTL and Cable companies) there will be the "haves" and "have nots" on the superhighway. Consideration must be given to rural areas (farmers, countryside industries, cottage workers). The cable companies will not, at least in the near future, be building their networks into the remote areas of the British Isles and BT's local loop (last mile) network is not up to the job of delivering the superhighway.

If social and political pressure is brought to bear on the issue, then the role of radio, of wireless technology, of spectrum, of PCN of multimedia distribution systems and point to point microwave will have a major role to play in rural areas in ensuring that the superhighway is really an "accessible network capable of transferring large amounts of information at high speed between users."

Currently there is some debate within the DTI and the Radio Communications Agency, as to optimum use of the spectrum they regulate. The questions being asked are:

Is it still needed by the licensee?

Could it be put to better use?

How much do government agencies (eg the MOD) require of all available spectrum?

Radio spectrum is a problem in the UK's major cities, it is a scarce resource and it is not possible to efficiently re-use it. You cannot take a piece of radio spectrum, use it for one thing in Ealing, and for something totally different in Wandsworth, because the boundaries of spectrum cannot be simply defined (eg ghosting on TV sets, interruptions to radio programmes, taxi drivers chatter breaking in on cordless phone conversations.) In city centres wireless technologies should only be used for people on the move eg emergency services, mobile phones, cars radios, taxi drivers etc.

In rural areas these arguments are not as relevant. More spectrum is available to be used for bringing the information society, multichannel television, competitive telecom service and "large amounts of information" to the residential and business communities. (The arguments about geographic universal service—services to isolated companies—still go on—but in reality with current technologies eg VSAT, PCN and other radio service, the issue is not now; about accessing those customers—its more about who will pay for it.)

CONCLUSION TO PART ONE

The superhighway will comprise a compendium of competitive communication networks. These networks will all interconnect with each other, (a little like the way banks transfer money and data between each other) and allow a market to develop for the delivery of data, of image and of video. The players in that market place will include the long distance telecom operators (BT, Mercury, Energis, the Waterways, British Rail and NTL), the local loop operators (BT, Cable Companies, PCN and Cellular operators) and the radio/wireless companies (Millicom, Cable companies (LDOs), Ionica, BT, cellular operators etc etc).

However whatever the roles and usage of the superhighway will be today, and in the future, the local loop—the last mile will play a very significant role in its development, and if it develops with BT, cable companies and wireless companies all offering the consumer (business or residential) a variety of services (entertainment, information and interactivity), then that compendium of networks will serve its purpose.

PART TWO

Access to the superhighway and the customer

Almost everyday in the newspapers we read about the OFT/MMC/DG IV looking into vertically integrated networks. (MSG in Germany, BSkyB in the UK and many more). If there is a full and robust market at the local loop eg BT, cable company, wireless provider, then the need for regulation is removed. The question that has to be asked is, who owns the customer? In the commercial world can a network provider, restrict access to their network, to a software/information provider (eg cable channel, information data base company, local authority, hospital, school or university) for commercial gain. Could BT or a cable company or a wireless operator refuse to carry the BBC's/ITV's interactive fishing channel, because those operators run or want to run one of their own. Access to the superhighway is in fact a two way street.

(1) Access to the customer.

(2) Access to the provider of the service.

The issue of access in a competitive market place is minimal. The question that has to be asked is will the UK establish over the next few years a truly competitive market?

QUESTION 1

ECN has broadly covered this point with regard to the UK in the preface.

ECN believes that the issue of compatibility is an important one that should be addressed.

The UK is currently leading the world in the role out of communication networks. Trials are underway in the US, the Pacific Rim, Australasia and mainland Europe, but these are predominantly only technical trials. They are to establish technical competence (eg switching video images, ATM, interactive games and services, VOD and NVOD etc).

In the UK, BT and the cable companies are also trialing technologies, but today, thankfully, are more concerned with researching consumer issues. Being technically able to deliver 400 channels of digitally compressed TV, of Video on Demand, or access to the British Library's database is one thing, but will the customer want it, will the customer be able to use it (70 per cent of adults cannot programme their VCR) and more importantly will the customer be prepared to pay for it.

As to "incompatible network standards", ECN does not believe that the technical, commercial, nor physical interconnection of networks is, or will be an issue, as long as OFTEL continues to watch over monopolistic practices. Cable companies interconnect with BT, Mercury, Energis, NTL, Cellnet, Vodaphone, PCN, BBC, ITV, Astra etc, etc. It is vital to all communication businesses to make use of competitors' networks (currently 60 per cent of all cable companies' long distance traffic is handled by BT—the remaining 40 per cent is handled by Mercury).

The problem that actually needs to be addressed is not in the network standards themselves, but in the software compatibility.

If a health trust in Manchester, for example, develops software to transmit a patient's data or image from the GP to the hospital, or from hospital to hospital, that is an excellent and effective use of this technology. But, is that software from the Manchester based health trust compatible with the software being developed by another trust in say, Aberdeen or Exeter? If one trust needed to exchange information with another about a patient, is the software inter-operable, could the two hospitals communicate through their software? Can you play a Beta cassette on your VHS recorder? The answer is, no!!

The main question here is who will produce the standards for inter-operability and who will police them? The issue is not actually about "network standards" because the commercial communications market will ensure compatibility. The issue is about software standards on the network itself.

QUESTION 2

It is difficult to take a menu of requirements and fully analyse them—one major question in all of these categories is who pays? ECN has identified below each category and provides bullet points that go some way to answering the committee's questions.

(i) *Public Information:*

- Local and national authorities have funding to ensure that relevant information is passed on, in a timely, and efficient manner to the public. The means they use today, include, national newspapers, radio, TV, Teletext, local newspapers, E Mail, and the Internet. There is no reason to assume that they will not also make maximum use of "the superhighway".
  - (a) when it is available in their area of operation;
  - (b) when it has critical mass to make using it nationally cost effective.
- All cable companies provide subscribers with the Parliamentary Channel.
- BT offers services to local authorities.
- Cable companies work very closely with local and regional authorities. Local authorities will probably end up being cable companies biggest customers, their boundaries are very similar and LAN/MAN or tie line networks are much cheaper when provided by cable.
- Videotron in Southwark and Nynex in Manchester are developing networks to allow local authorities to trial services in their respective areas. A number of other joint ventures between cable operators and local authorities are currently underway.
- Cable licences all talk about "local channels". The ITC is currently looking into the availability of local product. Commercially nobody really knows how realistic "a local channel" will be, but a number of operators provide local news, weather and other information, in a mixture of text and video formats.
- Libraries/Civic Centres should allow access to "the superhighway" for people who cannot afford to have the service in their home/office (see public information).

(ii) *Commerce*

- To put it bluntly ECN believes that commerce will take care of itself.
- BT, Mercury, Energis, MFS, ACC and a number of other companies are now offering business services, to the city centres across the UK. These services are beyond anything the average businessman could possibly have imagined back in 1986–87.
- The commercial companies that have lost out over the past 10 years of liberalisation have been the small/medium sized enterprises not located in city centres.

  Today these companies and organisations are the target for a number of service providers, that include cable companies, cellular operators, Mercury and of course BT. The commercial and financial world will help drive the superhighway—it will look naturally for cost effectiveness, efficiency and economies of scale and scope—exactly what the superhighway is designed for!

(iii) *Finance*

- See Commerce:

  These networks and the software used on them, will be driven by the financial and commercial establishments.

(iv) *Education*

- The first question to be asked is who pays? Is education, as an establishment and resource, part of a USO (Universal Service Obligation). Should it be the case, that public schools, (privately funded) buy access to the superhighway, but poorer inner city schools cannot afford to and therefore miss out on the opportunity it provides.
- Every cable operator, in the UK has agreed to provide a cable feed into each school they pass as they build out their network.
- BT have promised to provide a feed into every school.
- The issue, as identified by ECN, is not about access to the network, but what programming, information and data is made available to the schools, colleges and universities, and more importantly, who funds it? The Department of Education is currently consulting on this issue, and there are a number of other initiatives underway at a local level.
- ECN is involved with a number of leading companies to assist in the development of these initiatives.
  - (1) Developing programming that fits with the national curriculum;
  - (2) Connecting schools, colleges, universities together to be able to share information—SuperJANET is just one example of this;
  - (3) Developing other initiatives and testing them in schools and colleges.
    - (a) The "Better English" campaign;
    - (b) Supporting media studies in schools and colleges;
    - (c) Allowing schools and colleges to make the actual local channel/programming by providing them with the relevant technical equipment;
    - (d) Liaison with providers of printed schools material to ensure they are prepared for the "superhighway".
  - (4) Working with educational advisers and the education authorities themselves to determine what they actually need.

(v) *Industrial Training*

See finance and commerce.

(vi) *Health*

ECN believes that Health services fall between two of the categories identified, they have a commercial requirement, but in some cases lack the funding or the expertise needed to fulfil that requirement.

- If "the Superhighway" can save the authority or trust money, and at the same time make them more efficient, then, this is an excellent use of the technology.
- Videotron in the west of London, has already connected a number of hospitals and GP's surgeries together, in a fully interactive broadband network. This network allows for the instantaneous transmission and receipt of data, video telephony and video pictures.

  For example ultrasound pictures can be transmitted from a GPs surgery or a hospital, to a different hospital, where the "expert" registrar or surgeon is working, he or she can then remotely examine the patient and advise the doctor as to what course of action he would recommend.

  This is not the slow-scan ISDN service, that has been around from BT for many years, but a fully interactive broadband service.

  The system in West London is growing rapidly at the request of the local health authority. If a patient can see their local GP, be examined by the best surgeon remotely, and have a course of treatment prescribed quickly and efficiently, then everyone benefits, patient, doctor and hospital authority.

NB. Please see the issue of inter-operability of software and the issue of universal service elsewhere in this document.

(vii) *Social Services*

See local authorities and health.

(viii) *Entertainment*

— ECN believes that entertainment will only be a small part of the traffic on "the superhighway".

— With digital technologies and the development of compression techniques (over the next 3–5 years), between 400–500 entertainment channels will be available.

— Access to the network and control of the customer will need very careful regulation.

— Vertical integration of the network (cable and telephone lines), the software (the programmes) and the encryption (scrambling) system should also be carefuly watched—(See latest announcements from DGIV and OFT/MMC).

— Announcements about technical trials from providers offering Video on demand or services on Demand does not necessarily mean that consumers will buy into those technologies.

— The arguments about the "haves and have nots" will continue to apply here. Should an entertainment provider eg Cable/Satellite company have to provide service to a home that cannot pay for the services? (Demographic not geographic universal service—the social obligation).

— Should the USO (Universal Service Obligation) apply to television/entertainemnt services as well as telecommunications?

— The "set top box" and the decoder are currently part of the network, should they be "liberalised" and sold/rented separately from the network itself. In the case of cable companies, OFTEL seem to think so. (The vertical integration argument, is a major factor for providers of channels and programmes. The debate about the set top box/decoder has a significant bearing on the issue of access to the network and access to the consumer.)

— Who should regulate entertainment and "info-tainment" on the networks. The question has already been asked in Brussels, the ITC and OFTEL are publicly arguing the case in the UK and the FCC in the US is having a very careful introspective look to see how it will manage the issue.

(3) As discussed in the preface to this submission, there will, in ECN's opinion, be at least three local loop delivery infrastructure providers. The cable communications companies, BT, and predominately in rural areas, wireless technology providers. There will be over a dozen long distance infrastructure providers, to carry the information and programming around the country. These companies will include BT, Mercury, Energis, Vodaphone, Cellnet, ASTRA, Eutelsat, Intelsat, Colombia, Orion, British Rail, the Waterways and National Transcommunications Ltd. All these providers, local loop, long distance and satellite will technically and commercially interconnect to carry the services, to create a "compendium of competitive communication networks".

(4) ECN believes that there are two parts to the Universal Service argument:

(1) The Geographic USO—access to services wherever you live in the UK.

(2) The Demographic USO—access for those, that, for whatever reason, cannot afford to pay for the "superhighway" facilities, be they entertainment or educational/informational services.

The Georgraphic USO can be simply resolved by levying a licence fee on all operators to cover the cost of getting network to remote areas, this is already being discussed in the telecoms arena, DG XIII, in Brussels, and OFTEL, and could be easily applied during the role out of the superhighway.

The demographic USO is a political dilemma. Should everyone, whether or not they can afford to, have access to the superhighway? The schools issue has been resolved, but arguments about service into hospitals, libraries, civic centres still continue.

(5) ECN believes that central Government does have a role to play as "the Superhighway" develops. One significant issue, is protection for new entrants, from monopolists or near monopolists, especially in the early years.

As the UK currently leads the world, in the role-out of fibre networks and interactive broadband systems, the opportunities are excellent for UK based manufacturers and distributors of electronic and engineering equipment to "export" the expertise they have developed in the UK, into mainland Europe, Australia, the Pacific Rim and to some extent the United States, as those countries try to develop the regulatory and legislative process to "kick start" their versions of the Superhighway. The UK government should use their vast resources to assist in this process.

There is a danger, that when Governments do get involved with fast moving technologies, they try to pick winners (France and Germany), this should be avoided at all cost, the market place should decide. The Government role should only be to regulate for a fair open and competitive market place.

(6) See Public Information.

ECN has stated that local and regional government will in all probability be one of the biggest users of the cable networks and "the superhighway". The development of remote delivery of services (classrooms without walls, GPs linked to hospitals, access to vast data banks, libraries, museums and other networks for education and commerce, home working and electronic cottage industries) will all have a role in altering the way we work, learn and play.

Location in the business world has resulted in centralisation of industries and their workforces. "The superhighway" does not have a locus, it does not as an entity, exist, and therefore in today's electronic business world, the location of the work-force is not central to the business base. This will assist local authorities in opening up areas, that have seen businesses move away, and allow them to create new local economies, using these communication "superhighways".

(7) See point 6.

As competitive networks are established to compete with the incumbent communications providers (eg BT, Post Ofice and the BBC), those monopolists or near monopolists rationalise their work-force, look for economies of scale and scope in the way they operate and do business, and use technology not manpower to improve efficiency levels.

This results in a reduction —sometimes quite dramatically—of the work-force. (BT employed 240,000 ten years ago, that number is down to 120,000 today and the company is looking to reduce that number even further to between 80,000 and 90,000 people.)

Banks and analysts use the ratios between revenue and the number employed, and, network usage and the number employed, as measurements of a telecommunications company's efficiency. Using the BT case as an example this results in two political scenarios.

(1) British Telecom, as a result of competition is a leaner meaner "telecom's machine", that is highly efficient and therefore well prepared to take on other telecom markets around the world, and win significant business.

(2) Competition has resulted in the loss of many tens of thousands of jobs, and the only people to benefit are BT's shareholders.

As British Telecom shed jobs in the late eighties and early nineties, their competitors took up the slack. Many of the tens of thousands of BT's redundancies were very employable people. They quickly found jobs in the electronics, communications and manufacturing industries. Today the Cable companies directly and indirectly employ around 50,000 people, and if one adds the work-forces of Mercury, C&W, Energis, Vodaphone, Cellnet, Ionica and the manufacturing and distributing companies in this new telecoms environment, then the actual gap between redundant workers, and those employed by other telecom companies is minimal.

As ECN stated earlier, with the UK leading the world in legislation, regulating, building and operating "the Superhighway"—that work-force and the expertise it has acquired is a very exportable commodity.

(8) Software and applications on "the superhighway" are today, and will continue to be, a contentious issue. Nobody in the world today is really sure just how much the residential consumer will make use of these new high speed networks, nor whether they will be able to understand how to use them, (eg programming a VCR) nor how much they will be willing to pay.

The business world will drive the applications on these networks, and it is in this area, that trials and being undertaken in the UK by banks, large consulting companies, and national retail organisations. The development of the business software, will naturally migrate to the residential user, once it has been tested and proved.

The UK residential population is changing. The children and young adults of today are "the computer generation". Technology and electronic communications hold no fear for them, and it will be they, who become the customers for access and egress to "the superhighway". The younger generations will demand more from their service providers, better software and faster and wider access, they will also play a role in the development of software and thus naturally increment the commercial market for network and applications.

Conclusion

The Science and Technology Committee's examination of the issues surrounding the "Information Superhighway" is a timely one. There is, in the press and the communications industry, a great deal of hyperbole about the issue, and ECN hopes that this evidence goes some way, to separate out the hypocrisy and allow you as a committee, to reach a meaningful hypothesis.

Evidence from the European Informatics Market (EURIM)

EURIM is an All Party Parliamentary Group whose members include Corporates from commerce and industry and not for profit associations. It addresses European IT and communications related Directives and policy proposals. Its Working Parties are currently addressing a number of the questions raised in your call for evidence.

Item one of your questionnaire asks "what specific problems arise from incompatible network standards and why are these incompatibilities arising". The EURIM Standards Working Party has made an in-depth study of the problems of standards incompatibility, publishing conclusions in August 1994 and issuing an upate the following November. Further copies are attached for your convenience. Nothing significant has occurred since then to alter our main findings.

The Select Committee's question is restricted to "incompatible network standards". Communications are the lifeblood of any trading nation. Specific problems arise if incompatible communications standards cause business to be lost or worse, trade to cease. The question to be answered is "could this happen and if so in what circumstances". Unfortunately there is no simple answer.

The definition of "network standards" may confuse. It is in fact a standard term describing the third layer in the so-called International Standards organisation (ISO) 7-layer model. It refers to those standards which allow messages to be routed, controlled and acknowledged between users. Layers one and two are called the "physical" and the "link" layers whilst the three together are referred to as the "network service layers". All seven layers have to work perfectly for a message or computer file to transfer without corruption from one computer to another.

At a basic level, the Standards bodies, including the ITU and ETSI, supported by the old national Telecoms monopolies, ensured that network standards are compatible internationally. However, total compatibility does not exist between the operating systems at either end of networks. Nor is it certain that everyone will always understand the messages—voice, data, picture etcetera—which form the network traffic. Presumably, it is these supporting "standards" which interest the Select Committee.

Lack of such international agreement allows new competitive standards to emerge, as has happened on the Internet with TCP/IP, which spans all four of the upper layers of the ISO model. Conversely, competitive standards prevent or delay the international use of common standards for what are becoming basic services, with all the elements of a Utility. Somewhere between these opposing poles, there lies a date, beyond which the return for international commonalty exceeds the return on further innovation of standards.

The concerns which competition in standards can cause is well illustrated by the 1994–95 report to the European Parliament on the Internet from its own researchers. This speculated on the possibility that the USA had deliberately and secretly supported the growth of the Internet's TCP/IP communications standard for the trading advantage it might bring to the US, whilst at the same time publicly supporting ISO approved standards. (The suggestion appears subsequently to have died.)

Where there is known to be incompatibility between systems, bridges can be built. A nation which depends on international trade needs to promote compatible systems or, at the least, bridges between incompatible systems, prior to any trading disadvantage. The two most common types of communications today in electronic trading are person to person (by E-Mail) and computer to computer.

Most of the larger Corporates today have networks based on ISO approved standards. These have tested levels of security and privacy which currently are unavailable via normal Internet communications, using TCP/IP. The advantages of the latter, however, have already ensured that work on extra standards to build in security and privacy using the Internet are ongoing.

In respect of communication between one computer and another, the current international *de jure* standard is EDIFACT (Electronic Data Interchange for Administration, Commerce and Transport) which is administered under the auspices of the UN/ECE (Economic Commission for Europe). EDIFACT standards operate above the ISO 7 layer model and can be considered as a common language for computers. It is itself quite literally "a bridge" since it allows parties with differing computer systems to communicate with each other, using its protocols.

The major complaint about EDIFACT has been the time that it takes and the bureaucracy involved in getting new message standards approved. The European Commission has been much exercised about this and has pushed through a reorganisation of the European standards body responsible. It is too early to say whether this will speed up EU standards approvals in the way intended.

There are dangers in approving *de jure* standards too quickly. The faster the approval, the more the likelihood that some better proprietary or *de facto* standard will emerge to challenge the new *de jure* standard. Furthermore rushed *de jure* standards rarely take account of future problems arising out of convergence with other disciplines, as is currently the case with the, in all other aspects, highly successful GSM standard for mobile communication.

EURIM supports the increasing tendency for generic standards making, whereby whole marketplaces combine together to agree on standard messages, which are both relevant to and use the terminology of their trade, and which are then submitted to EDIFACT for *de jure* blessing. In as much as the trade happily uses such messages before this blessing, it can be said that such standards are achieved faster.

However, these are not problems of incompatibility. In its role as a bridge between computer systems, EDIFACT overcomes incompatibility and older standards (Tradanet in the UK: ANSI in the USA) are migrating over time to EDIFACT messaging.

Another result of the recent standards review by the European Commission has been that it now accepts the importance of de facto standards. EURIM supports this since such standards, born proprietary but made available to all to use, are thus "open".

EURIM would like to see Governments and standards bodies place greater interest on the need for vendors to agree standards prior to investment. *De jure* standards can only be achieved post investment and require consensus: a state which is hard to obtain when rival vendors have invested heavily in systems which have then been developed with incompatible standards.

The climate today for agreeing standards prior to investment has never been better and the opportunity to capitalise on this should be grasped. In communications, the Internet has demonstrated that free access into an international standardised network is repaid by charges collected on substantially increased traffic.

In applications, the disaster of the Betamax/VHS saga plus the ever increasing costs of development are anyway resulting in some coming together by vendors prior to such development. Examples include the single standard "Digital Video Discs" as agreed by Toshiba, Sony and Phillips and the new "Miniature Card" reported to have an open standard, as agreed by 13 US, Japanese and European Companies. These Companies are said to include the world's largest producers of flash memory chips, which increases the chance of the common standard turning into an industry standard.

Continued UK leadership in respect of international open standards for networks is essential. So also is the need to ensure that the UK completes its adoption of them across all its actors, at least as fast as any other nation, since this will impact favourably on trade and thus on our standard of living. Leadership, to ensure that this happens, is required from both the public and the private sectors.

Viscount Chelmsford

1 February 1996

Memorandum by the Federal Trust

1. In 1994–95 the Federal Trust conducted an enquiry, under the chairmanship of the Rt Hon the Lord Cockfield PC, into the future of information technology and telecommunications in the European Union. Mr Andrew Adonis was rapporteur. The report, *Network Europe and the Information Society,* was published in July 1995, and we would refer the Committee to it as it addresses many of the main questions raised by the current House of Lords enquiry.

2. In addressing the policy involved, there are three areas which need to be considered:

- creation of the Infrastructure;
- development of the Services using that Infrastructure;
- widest possible access to those Services.

It is only if all three are addressed that the full benefits of the Information Society can be harvested. And they need to be addressed not just in a UK context but in a wider context embracing the European Union and, increasingly, the Greater Europe.

3. In this connection, we note in particular that the terms of reference of the Lords' enquiry do not specifically embrace the European dimension; we hope nevertheless that the Sub-Committee will not ignore it. The research and development of the science and technology involved in designing "information superhighways" are not national; neither is the investment required to build them; nor are the markets to exploit them. Indeed, it is in the networking of the *infobahnen* across the continent and globally that much of their value will be realised. The social and political problems being addresses by the Sub-Committee are not uniquely or even particularly British, being shared in all respects by out European partners. European Community telecoms law already applies and is extensive; and, of course, it is the EC that is responsible for international negotiations in the WTO. Inevitably, much of what we say is directed to the European rather than an exclusively UK dimension, although in a wide part of the field their interests coincide.

4. Few now doubt the critical importance of "Network Europe" to the future prosperity of the European Union. The issues facing European governments are how to promote the investment required to build the Europe-wide infrastructure within a short period; and how to mobilise the new technologies to enhance competiveness, the quality of public services, access by the widest possible spectrum of the public and in general to contribute to improving the quality of life for the people as a whole.

Until now, the European Union has been mainly concerned with issues of competition and infrastructure. These will continue to be important, but it must be more dynamic in using the emerging Network Europe to promote education and information. The information superhighway offers a striking opportunity to enhance not only European competitiveness but also the understanding and participation of the general public in the affairs of the Union as a whole.

5. The potential demand for services is very great—but public policy errors could delay their developments by years, or put them beyond the reach of most citizens.

The European Union has established an important role, both regionally and internationally, in the development of a networked Information Society. The EU needs to accelerate its programme to open existing telecommunications monopolies and infrastructure to effective competition, and to insist on its completion. Member states must establish independent regulatory structures well in advance of the EU's liberalisation deadline of 1998. Until policy over competition and regulation is clarified, the questions of financing, licensing and interconnection will remain problematical.

The Federal Trust study group did not think that the case for a single EU regulator in the IT/telecoms sector had yet been made out. We believe that the general competition powers of the Commission constitute a powerful goad to governments and operators alike; and the Commission should take the lead in coordinating the national regulatory authorities so that cartel and fair trading policy in different member states is not divergent. To this end, we propose that a formal committee of national regulators is set up, chaired and serviced by the European Commission, to promote best practice between member state governments and to tender advice to EU and national competition and regulatory authorities.

6. If the Information Society is to become a reality soon, the European Union must resolve its approach to competition and universal service with regard to the new broadband network.

- *Competition.* As liberalisation advances, the general principles of EC competition law on abuses of a dominant position and restrictive agreements, the rules on the free movement of goods and services, and the restrictions on state aid are, if strictly applied, adequate for the development of broadband networks and new services using them.
- *Universal Service.* It is vital that the desire to guarantee universal service does not unduly hinder investment or distort competition. We recommend the definition not of minimum standards of service which must be provided in all areas, but of maximum levels of service on which member states can insist. To promote access and services in uneconomic areas, we propose the establishment of national universal service funds, managed by national regulators and supported by a strict approach to the separation of costs in the accounts of operators and to the application of EC Treaty rules. The common definition of maximum permissible levels of universal service would need to be accompanied by a meaningful system of dispute resolution underpinned by national regulators.

Widespread access is the key. The immediate priority is to ensure that services are widely available at an early stage, and that attention is paid to the needs of both the major corporate users and the individual citizen. The imposition of formal "universal service obligations" should be progressive, taking account of the cost and availability of new services.

7. The principles of Open Network Provision (ONP) need to be emphasised. EC law already sets out a series of basic requirements on access to the network. Conditions of access are to be transparent and, above all, equal: the operator cannot privilege his own operations over those of other service suppliers. This applies not only in such matters as access charges but also in the software access protocols. The ramifications of ONP for commercial operations is evident. The principle of providing access to the superhighway will be a basic building block of the future European economy. The ONP directives lay down the fundamental means by which this principle is to be achieved.

8. Public funding at the EU and UK levels should be tied to the development and take-up of services on the network, particularly among those users, notably in the health and education sectors, that are largely dependent on the state. Such funding should be directed to the users not the suppliers. The EU could have a dynamic role to play in promoting pan-European educational and information services along the superhighways. The EU structural funds should be redirected towards the same goals, especially in the peripheral regions. The EU's instruments may need to be adapted further to meet the financing needs of the Information Society as new stages in its development are reached.

9. Investor confidence in Network Europe will grow once the political conditions are set, the regulatory framework is in place, and the pace of technical standardisation increases. To encourage investment and innovation, bans on telecoms operators providing certain forms of service, such as broadcast entertainment, should be only temporary.

10. We believe that the successful combination of building the information network and promoting its use throughout society will have six highly beneficial consequences:

- the task of building the EU Single Market will be completed by the addition of the physical infrastructure;
- business will use the capability of integrated information technology and telecommunications to become more productive and competitive;
- government at all levels will exploit the same facilities for public administration;
- many jobs—perhaps 10 million—will be created once Europe's IT manufacturing and service industry gears up to satisfy consumer demand;
- both the liberalisation and integration of Central and Eastern Europe will be hastened by the information technology revolution;
- European citizens will be empowered by greater access to education and information to take more charge over their own lives.

The challenge, therefore, of building *Network Europe and the Information Society* should motivate those who sit at the Intergovernmental Conference due to begin this year, and should inform political debate in Europe at all levels. Here, as in other matters, the UK has a strong interest in taking a positive lead.

Andrew Duff
Director of the Federal Trust

Lord Cockfield
Chairman of the Study Group

5 February 1996

Further Education Development Agency (FEDA)

OVERVIEW

1. FEDA is a new body, bringing together the old Staff College and Further Education Unit (FEU) within a new Mission, to provide services to further education which promote quality, lead curriculum design and development, and enhance effective governance and management.

2. In October 1995 we published our first strategic plan, in which we identified "Learning and technology" as one of five key strategic areas. One of the specific priorities within that Programme area is to develop electronic communications and information systems for further education in collaboration with key agencies, FE institutions and companies.

3. An increasing number of further education colleges is now connected to the "Information Superhighway" and can see enormous potential for communication between staff, students and institutions, access to learning and learning materials, and a means of marketing courses and other services in imaginative ways. There are examples of related local and regional co-operative projects.

4. The recent report of the Learning and Technology Committee of the Further Education Funding Council recommended improved national access by further education to a communications network. The Committee also noted the need for this to happen in a co-ordinated way and as part of an overall strategy to maximise the potential of information technology.

5. The FEFC will be consulting the FE sector shortly about the recommendations of the Committee, which envisage FEDA working in collaboration with the National Council for Education Technology, implementing and managing the overall initiative. In the meantime, we shall continue to develop activities in this area, in collaboration with the NCET.

SPECIFIC QUESTIONS

Question 1

6. By the "Information Superhighway" within the sub-committee's definition ("a publicly accessible network") most colleges mean access by staff and/or students to the Internet via computer links into the telecommunications network. FEDA knew of under 50 colleges with subscriptions to Internet service providers six months ago; it is likely that this number has grown substantially since that time.

7. A smaller number define the "superhighway" as access to learning opportunities using (for example) local cable channels. There are also private/closed networks for (eg) the exchange of examinations data and electronic mail services.

8. FEDA's view, reinforced by the report of the Learning and Technology Committee of the Further Education Funding Council, is that current developments are haphazard in terms of usage because of inadequate co-ordination and lack of a clear curriculum strategy which a national support programme could provide. Much use of services on the "superhighway" is erratic, although generating interest and excitement. There is also widespread fear of the potential cost of telephone connections. A "map" of the highways and a clear "fare" structure would encourage purposeful travel.

9. The European Commission's DGXIII has noted some incompatibilities between related European and US standards.

Question 2(iv)

10. Several colleges (independently or via a contractor) and some national agencies (such as the National Council for Educational Technology and, shortly, FEDA) have established "World-Wide-Web" pages available on the Internet to provide information and/or links to other sites on the system.

11. Staff and students use random searches or more systematic searching "tools" to find information in particular curriculum areas. There is extensive use of electronic mail and access to specialist news or debating groups.

12. Some organisations (for example BT with its "Campus World") attempt to allow searching for information and communication within particular parameters (for example a GNVQ subject area).

13. Services which will or could be developed (for example as part of FEDA's GNVQ Support Programme and if the recommendations of the Learning and Technology Committee are accepted) include:

- — access to learning materials of an agreed standard;
- — access to banks of units of qualifications as part of a possible national credit accumulation and transfer scheme;
- — electronic publishing of prospectuses, journals and other material;
- — computer conferencing and other developmental communication between staff;
- — electronic communication and information searches by students;
- — transfer of data between colleges and with funding bodies.

Question 3

14. Some of these services will be provided by public sector agencies such as FEDA and NCET, some by communications organisations such as BT, Microsoft and CompuServe, some by independent or co-operative educational publishers, some by further education colleges themselves.

15. There is, for example, a wealth of existing understanding about good practice (from NCET, the Open University and others) in tutorial support for remote learners, effective design of distance learning material, and computer screen layout. This needs to be generalised and applied in the new context.

16. It might be possible to provide key information about quality standards for curriculum content and materials on the "superhighway", taking account of the possible development of a national post-16 credit framework, and the outcomes of Sir Ron Dearing's current review of 16-19 qualifications.

Question 4

17. The major issue here is the cost of installing and using telecommunications links between computers. The recent consultative document from OFTEL recommends a flat-top tariff for schools; users in higher education are accustomed to liberal use of the "superhighway" because of the existence of dedicated leased lines; FE has not experienced either of these benefits en masse and the Learning and Technology Committee recommendations and some local developments (in Wales; in the North East of England) have been designed to overcome this problem.

18. FEDA believes that a further education version of HE's JANET and SuperJANET would secure more equitable access.

19. FEDA is also working with a number of colleges using local cable services to provide access to marginal groups (for example Halton College in Cheshire and its cable links to single women parents in isolated economic/social locations. The results of this work, which FEDA is managing with the Esmee Fairbairn Trust and the Association for Colleges, will be published at the end of 1996.

Question 5

20. FEDA would have a role in some of these areas if the recommendations of the Learning and Technology Committee were accepted and funded. For example FEDA and NCET would expect to continue their co-operation with related organisations in the UK information technology industry. FEDA would expect to continue to disseminate UK developments to its overseas market of further education professionals.

Question 6

21. FEDA is working with all the Welsh colleges (which are supported by funding from the Welsh Office and Funding Council) in the current development of "FE NET"; working with (for example only) colleges in the North West of England developing uses of the "superhighway" with money from the Competitiveness Fund; working with colleges in Greater Manchester and Merseyside receiving local authority support for related initiatives.

22. FEDA is documenting the impact of such local partnerships, contributing to their educational and training dimensions, and will publish related findings in the usual ways and electronically.

Question 7

23. There is substantial evidence of the potential of related developments in information technology to release creativity and enthusiasm amongst students which requires new skills and approaches from teachers. There is general agreement that staff and students require information technology "core skills" for sustained employability.

24. FEDA has carried out, and will continue to undertake, research and development in these areas.

Question 8

25. Much of further education has adopted US software (eg Microsoft's Windows and Novell's Perfect products) as standard. It is unlikely that this position will change. However, whilst using US products for communication and productivity, there is potential for growth in UK computer-based learning materials whic reflect UK rather than US cultures and languages. The number of colleges (around 500 in England and Wales) does not provide a large market; individual "distant" students and the wider community may do so. There is a buoyant market in parts of the schools sector and curriculum and there is a competitive market for information systems software in all sectors.

16 January 1996

Memorandum by Mr J M Harper

1. The Sub-Committee correctly defines the "Information Superhighway" as a publicly accessible network capable of transferring large amounts of data at high speed between users. This memorandum addresses the issues under the Sub-Committee's headings.

Form of the Super-highway—the Technology

2. It was originally conceived that the highway would be based on provision of optical fibre, with its capacity for very high speed high capacity transmission, through to every home and office. This proved impossibly expensive. Two cheaper patterns of technology are now crystallising. Existing operators like BT are replacing their existing copper cables with fibre to intermediate points a few hundred metres from the customer. The rest of the way they are adding electronics to the existing copper cables to increase their transmission capability. New operators like the UK cable TV operators are similarly installing fibre to intermediate points, but then a combination of coaxial cable for TV and conventional copper pairs for telephony the rest of the way. Their networks require upgrading with additional electronics if they are to serve as information highways in the Sub-Committee's definition.

3. The respective patterns being followed by telecommunications and cable TV operators in the USA are broadly similar. It now seems certain that legislation setting each side free to operate in the other's territory will be enacted in the US. At the same time the heavyweight media and computing interests are vying to develop imaginative applications and to make money out of the new facilities. Certain Continental operators like Telefonica in Spain are creating new distribution networks which follow much the same pattern as that of the cable TV operators in the UK. Japan, which started out with plans for fibre to every home, now appears to be lowering its sights to a similar pattern to that of the western operators. Certain other countries on the Pacific rim like Hong Kong and Singapore have ambitious highway plans.

4. BT is progressively replacing copper with fibre out to intermediate points in its distribution network for quite separate reasons, because of the cost and other advantages for conventional telephone service. (In this respect BT is ahead of most of its fellow ex-PTTs on the Continent). This is forming a backbone network of fibre "spines". These spines are used to feed fibre final connexions to large customers who have enough high speed data traffic to justify them. The spines also make it possible to provide high speed fibre connexions to hospitals, doctors, educational establishments and so on. The value of such facilities for public service establishments in enabling things like remote teaching and remote diagnosis has been apparent for some time. It is being confirmed on the ground. This is the basis for the promotion of such facilities by the Government. It is also the basis of the agreement reported to have been reached about their development between BT and the Labour Party.

5. In the meantime the Internet is developing very rapidly for the general public using conventional telecommunications facilities. The speeds of communication available over such facilities are however limited. An important question is whether the demand from the general public for facilities on the Internet which require higher speeds, like colour moving pictures or high speed search of centralised databases, will become sufficient on its own to justify the investment involved in new telecommunications distribution and switching facilities and the creation of a "super"-highway. No-one knows yet.

6. On its side the cable TV industry has developed the idea of using two-way high bit rate facilities to provide "interactive" services which enable viewers to involve themselves with and influence the events they can see on their screens. But none of the results of the limited commercial trials of such facilities provided by either industry which have been conducted so far are specially encouraging.

7. To deliver high speed service for the general public high speed distribution cable facilities would need to be associated with high speed switching in exchanges. The technology for such switching exists (Asynchronous Transfer Mode or ATM packet switching) but it is immature. Its economics are a yet unclear, especially for public voice service. It is likely to be several years before the engineering issues are satisfactorily resolved. But it may well be that by the early years of the next century the ATM technology will have matured to the point where operators like BT are justified in using it completely to replace their existing conventional telephone switching and transmission networks on grounds of the cost and other benefits to ordinary telephone service. If this happens the new ATM public switching resource will automatically be capable of providing high speed public data and videophone service. The effect may be to stimulate a faster pace of upgrading of distribution cable facilities, so that end-to-end technology for the "super"-highway as the Sub-Committee defines it becomes available on the ground. The progress currently being made by BT and its competitors in upgrading distribution shoud give this country a head start in this if and when it happens.

SERVICES AND APPLICATIONS

8. The public service applications referred to in paragraph 4 will be funded and steered by government and they may be expected to develop with some confidence, on a scale and pattern geared to the characteristics of the user services.

9. Applications for the general public on the other hand must be provided on a commercial basis. Many of those canvassed at present like home shopping or banking are perfectly capable of being provided over conventional telecommunications and do not in themselves require investment in new transmission or switching facilities. Such new facilities would however have enormous theoretical potential for completely new services and applications. The question is whether this potential can be realised in commercial terms. The answer to this question remains uncertain and speculative. The pressing need is for more extensive commercial trails and to determine how much demand really exists. The UK is ahead of the Continent in mounting such trials but it is behind the US and Japan.

10. There is an important underlying contention between services which could be provided on-line over super-highways if and when they come into existence and those progressively actually becoming available from desk-top CD-ROMs. The latter can provide access to large amounts of data and interaction with it comparable in many ways with what is foreseen as available over highways. The principal advantages of on-line arrangements in this contention arise from the much greater amounts of data which can be assembled on centralised facilities and the greater ease of updating this data compared with desk top facilities. The principal handicap of the on-line approach concerns the data transmission speeds available. The comparatively slow speeds available over conventional facilities make access times and processing rates appear painfully slow to users at present. The hazard is that desk-top facilities will become irreversibly entrenched in the market before higher speeds become available on-line over public telecommunications.

11. Insufficient attention is being given in this country to the question of design and production of new customer premises hardware for on-line highway services. The Internet is built round the PC. Its take-up is almost bound for that reason to be confined to people who are computer-literate, can afford a PC and are prepared to sit in a separate room and use it. The vision of common terminal combining both TV and on-line data functions which could sit comfortably in the living-room goes back to Prestel in the 70s. If either the Internet or high-speed highways proper are really to catch on with the mass public the industry needs to come up with a new generation of terminals retailing for much less than a PC which can be used by people who are not computer literate and which will fit in the living-room this will be the Americans or the Japanese. There is a potentially very rewarding opening here for the UK ingenuity and enterprise.

MARKET STRUCTURE

12. Both the development of applications and services and the development of the customer hardware for them are natural matters to throw open to the free market. If ever there was a field for small agile companies this is it, as the Internet is spectacularly demonstrating. That said, BT and its principal competitors represent far and away the biggest concentration of telecommunications know-how and resources in Britain. Their contribution to the development of highways and applications is indispensable.

13. Unfortunately the present British telecommunications regime is seriously hampering them in making this contribution. It also bears little resemblance to a real free market. In order to protect its competitors BT is encumbered by two overlapping bans on its participating in "entertainment" services, which it has protested for years are discouraging it from the development of highways. The House of Commons Select Committee on Trade and Industry in its Third Report for the 1993–94 session proposed a compromise formula to end these bans which is fair and workable but would take a long time to have effect. The competitors for their part are subject to licence requirements which oblige them to construct facilities at a rapid rate whether or not they are winning enough business to justify this. It is reported that at the present time they are investing £6 million per day. Yet at the same time they are in serious difficulty in attracting customers. The take-up of cable TV remains obstinately stuck at low levels (Figure 1). The companies are winning telecommunications customers from BT but at the low and notoriously unprofitable end of the market. In short their business

prospects are debatable. In addition BT, competitors and OFTEL are embroiled in a distracting confrontation over interconnexion of networks and "uncompetitive" actions by BT which is becoming more and more contentious, with no obvious way out other than periodic references to the MMC.

14. The situation amounts to a serious drag on progress with highways in this country. If they are really to develop their full potential for society and the economy a way has to be found to end it.

15. The most important single cause of the problems of the regime is the continuing dominant position of BT and the fact that its competitors are dependent on connexions into the BT network to dispose of the bulk of their customers' traffic. It is now practical from the engineering point of view to draw an organisational boundary at the periphery of the network infrastructure and to treat it and its operation as a sector of the industry completely distinct from the provision of services to users. There is a very strong case for a fundamental restructuring of the industry into wholesale (network) and retail (service-providing) sectors, not dissimilar to the way electricity and now gas are structured; for re-unifying network operations under a single regulated company; and for completely deregulating provision of services and throwing it open to all-comers, along with the development of a new generation of hardware. An important benefit of this would be to release the present operators, their investors and the country from the wasteful and unnecessary burden of duplicating very expensive network facilities in a risky and unproven market.

Universal Service

16. For a hundred years the *raison d'être* of telecommunications was the spread of service to the general population, starting with the telegraph and going on through the telephone to modern digital communications. This process has had profoundly constructive consequencss. We shall never be able to measure the extent to which the immense political progress since the British Great Reform Act of 1832 and the European Year of Revolutions in 1848 has been due to the advance of the telegraph and the telephone. As the rulers of the communist states were well aware, the telephone has become a key ingredient of democracy. And the better public telecommunications have become the better people have been able to organise research and production, to learn about products and services and place orders; and the more economies have expanded. It is not just a matter of a fair society to say that things must go on like this. Advances in telecommunications must never be allowed to become the preserve of privileged minorities, whether in big business or in politics. It would be an important effect of the proposals in paragraph 15 to help bring this about in respect of high speed highway infrastructure, by encouraging its spread to the general public. They would also eliminate the interconnexion disputes and make the present consequent debates about the burden to BT of universal service unnecessary.

The Role of Government

17. The role of government in supporting development of highway applications for public services has already been noted. It has a contribution to make also in fostering development by industry of a new generation of customer hardware. Beyond this, the proposal in paragraph 15 would involve formally subdividing BT's present functions and those of its principal competitors as between networks and services. Only government has the power to carry such a radical measure through.

18. Government has power also in relation to the regulation of content. It is a corollary of the arguments for universal availability of telecommunications facilities in paragraph 16 that their use must not be subject to any restrictions on material transmitted over them. The only restrictions acceptable in a free society are rules forbidding the transmission of obscene material, which it is the responsibility of governments to enact.

Conclusions

19. The Sub-Committee is invited to consider the following conclusions:

(a) the only way a full range of new telecommunications applications can be expected to develop is in a genuinely unregulated free market. The present UK telecommunications regime is not a free market; and it has led to counter-productive confrontation between BT and its competitors and regulators and to wasteful duplication of expensive facilities.

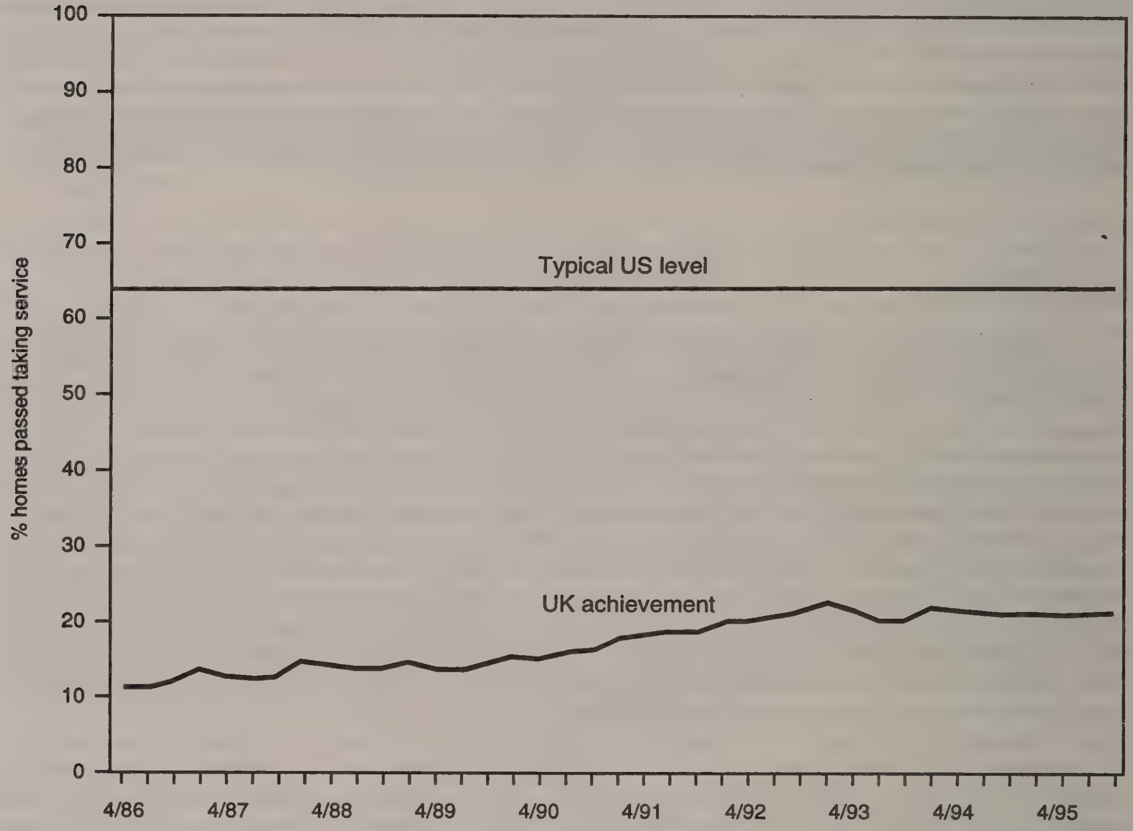
(b) There is a very strong case for restructuring the regime and the industry to create a genuinely free market for the development of services and applications for the general public, on the lines suggested in paragraph 15 above. Only government can do this.

(c) Insufficient attention is being given to development of a new generation of customer hardware for highways and the Internet. Both government and the Sub-Committee itself have a role in drawing out the opportunities this offers to UK manufacturers.

(d) With the sole exception of rules against obscene material control or censorship of material carried on the Internet or on highways would be undesirable in principle.

February 1996

Take up rate of Cable TV in UK **Figure 1**



Letter from the Heriot–Watt University, Professor Ray Leitch
Director of Information and Learning Resources

This is in response to your request for evidence related to the Information Superhighway: Applications in Society. As our primary businesses are education and research, I will restrict my comments to these areas.

Within the education sector, and in particular within the Universities, we believe that the development of the Internet will fundamentally effect the way that education is provided. Wide bandwidth communications and powerful computing elements will mean that the limitations of space and time which underpins the current organisation of the Universities will be diminished. We foresee the development of virtual institutions providing educational materials over the Internet, perhaps supported by short periods on a campus for tutorial and project assignments. The availability of such materials will also effect the way that students will study. Much more responsibility will be placed on the student to organise his or her own study programme, to study at their own pace and to submit themselves for examination when they feel appropriate. Such a scheme will bring fundamental changes to the education process and is part of a general shift of emphasis from teaching to learning; the availability of the Information Superhighway will accelerate this change.

We also believe that these changes will lead to Universities re-appraising what is their core business, ie what makes them distinctive within the higher education sector. This provides an opportunity for the rationalisation of the development of course materials and consequently to universities importing materials from more specialised institutions and exporting their own specialises. The quality of an institution will then be determined by the support of the learning process that is provided and the reputation for the specialises, usually supported by vibrant research activity.

As you see, we believe that the availability of the Internet, although it has substantially to be improved, will fundamentally effect the way that Universities will operate in the future. We also believe that given the international reputation of the UK Universities, the UK is well placed to pioneer these developments leading to many commercial opportunities world-wide.

Memorandum by ICL plc

INTRODUCTION

ICL welcomes this opportunity to provide evidence to the Select Committee on a topic that we believe will be of great importance in shaping UK competitiveness and the development of UK society in the new Millennium. ICL is committed to becoming a major force in the Information Society and is keen to play an active part in the UK debate and in UK implementation. ICL believes that the UK is well placed to be a global player in the new industries created by multimedia technologies. However, given the global market place, the window of opportunity for seizing leadership in these technologies in quite short. Given the Government's roles as a major user, a promoter and a regulator, it is important that HMG develops a robust and dynamic policy framework designed to place the UK in the forefront of these developments.

RESPONSES TO QUESTIONS

General

There is an important distinction between the European and US debate on this issue. The US debate tends to focus on the Information Superhighway, the technology infrastructure. The European debate has been about the Information Society. The importance of this distinction should not be lost. The vast US investment in infrastructure is certainly promoting the development of hardware and software technologies which will be of global significance. However, ICL believes that the successful deployment of these technologies requires action in three parts:

First, Awareness. Despite media hype there is still a strong perception that these technologies are the domain of the younger generation and that people over 25 and certainly over 40 will not get to grips with the new generation of technologies. Our real life experience in South Bristol disproves this theory.

With the South Bristol Learning Network, ICL has been active for over a year in developing an awareness programme for an inner city area with long-term social and economic problems. The activity is based on the reskilling of individuals at all ages and levels of society. These "Cyberskills" workshops have attracted widespread interest in the UK, USA and Continental Europe. In training around 5,000 individuals we can demonstrate that, handled appropriately, these technologies can be made intelligible and relevant to a wide range of people in industry, civil service, education and voluntary sectors. We have trained people up to age 80. We are in the process of setting up further centres in the UK and Continental Europe.

Second, Access. It is estimated that the deployment of these technologies across the UK is a task that will probably cost around 40 billion pounds to the point at which the infrastructure is justified by usage on a universal availability basis. This will consist of many projects in a highly complex and competitive market place, involving both public and private sectors. A wide variety of technologies, ISDN, Fibre, Microwave and Satellite are likely to be used in creating a full national infrastructure. There are many policy issues that need to be addressed in the area of access if we are to avoid creating a society of have and have nots.

Finally, Content. What will really make the superhighway a viable proposition is the availability of socially and economically useful application. The development of a UK multimedia industry that is a net global exporter is a realistic prospect if the UK develops its policies in the three areas outlined above. The focus of the Select Committee; "Applications in Society" is to be welcomed but it must be part of a coherent whole.

Q1.

The rapid development of the INTERNET and World Wide Web along with commercial providers such as Microsoft, CompuServe, America On-line continues to surprise even those of us in the industry. Much of the development in the UK and globally is based on "narrowband" networks, though we are close to seeing the first experiments on higher bandwidths in the UK. A wide variety of technologies are being used. There is no single route to the Information Society. Countries such as Finland or Australia with a large geography relative to population are very different to areas such as Southern Africa where the development of telephony is still in comparative infancy. The situation throughout Europe varies with the degree of deregulation in telecommunications. It is here that we believe that the UK has a competitive edge in both European and global markets.

Q2.

ICL is involved in a wide variety of Information Society projects in both the public and private sectors using multimedia technologies such as kiosks for public access in retail, banking and local authority applications. ICL is also involved in the development of technologies for the home marketplace and in various trials such as the Cambridge On-line trial for Video on Demand (VOD). In particular, ICL is concerned that if the UK targets for Competitiveness and social inclusion are to be achieved then the education and training of our citizens for lifetime learning is a centrally important application. There is a growing body of evidence that multimedia technologies can enhance the effectiveness of learning for both children and adults. One point to note is that the debate on the superhighway frequently identifies the need for a "killer application", one that will justify the overall investment that the other applications can then exploit. ICL does not believe that any single killer application exists, but rather that a rich array of applications that can be tailored to the needs and resources of individuals is needed. Partnership, in the development of infrastructure, content and tailoring services is therefore an important task.

Q3.

At this stage various partnerships exist between commercial companies, education establishments, telecommunications suppliers, IT companies, broadcasters and publishers. There are many issues in facilitating the creation of successful partnerships in that the "quality" standards between the different media are different. ICL's experience to date of building partnerships in this area is that overcoming the different operational cultures of the different media is both time and resource intensive. Furthermore, many of the skills needed are to be found in Small and Medium enterprises, SMEs. The different aspirations of public and private sector bodies along with different experiences of working in partnership between dissimilar types of organisations mean that time is required to develop suitable working relationships and practices. At this stage it is not clear how the market will develop, but there are a number of areas which are important.

First, SMEs often in a working relationship with a major supplier, seem to be fruitful sources of ideas and innovations and ultimately of new jobs.

Second, many initiatives are being stimulated by the availability of National Lottery funding, though it is too early to be confident that this will be a viable alternative to existing, traditional sources of funding.

Third, no single company has all the skills and technology necessary to develop successful complex projects. Partnerships are essential.

Finally, the deregulated nature of the UK is helpful in stimulating pilot projects, but there is a real risk of fragmentation, both in regulation and market development.

Q4.

The issue of Universal Service must be approached with an open mind. Talk of the information superhighway tends to focus on the anarchic, free, uncontrollable culture of the INTERNET. ICL believes that what we are seeing is the creation of new classes of Utility companies. Let us illustrate by example. Consider the "Education Superhighway". ICL sees this as essentially a competitive market with a distribution network connecting customer premises equipment at one end with information "power stations" at the other. Services for administration and billing complete our model. As long as basic principles such as open access, avoiding conditional access, and interoperability across the boundaries are properly regulated then the potential for developing competitive markets will be ensured.

However, there are new challenges to the regulators in the new environments. Much of our experience in the UK to date has been in regulating *existing* monopolies or dominant players based on physical resources such as oil and gas. There is a concern that a "lighter regulatory touch" is needed to ensure the growth of *new utilities* based on information.

Q5.

Government has an important part to play in the areas that we addressed earlier, Awareness, Access and Content.

In awareness, there is a need to ensure that the government exhibits and promotes best practise with it's own staff and that policies across government are made in the full light of the capabilities of new technology. The government has an important role with SMEs in helping existing companies to become aware of the technologies and to stimulate creation of new SMEs in the sector.

In access, a framework for universal access along with the development of government and local government applications in major social areas such as education and health offers potential for enhanced quality of public services. An important issues arises during the transition period in regard to the citizens charter for public services. It is quite possible that services could be delivered in seconds or minutes in areas where "broadband" infrastructures are deployed that would take days or weeks in areas where the services have to be delivered conventionally. Handling this transition and different services level expectations will be important.

In content, the government has a role in key social applications as outlined above, but also in areas such as the Libraries and Museums, where unlocking the nations archives has both educational and tourist potential. As mentioned earlier, the creation of partnerships is time consuming and resource intensive. Some assistance and stimulation should be considered, particularly the support of SMEs in becoming partners in substantial projects.

The area of regulation is an area of great importance. As the barriers between broadcast and telecommunications narrows, the need to rethink regulatory frameworks, both infrastructure and for services, in such areas as taste and decency, should be thought through. Some short term fixes may have long-term downsides that we should seek to avoid. ICL is determined to participate positively in the debate and recently responded to the OFTEL consultation in this area.

The issues of security, payments, protection of intellectual property are all areas of international concern. The UK government needs to work in partnership with UK industry to secure a liberal and competitive international regime. The blurring of traditional boundaries between industries also affects government. Interdepartmental co-operation, a more "collegiate" style of UK government will be needed in the fluid environment that we are likely to remain for the foreseeable future.

Q6.

Early pilots in the UK and elsewhere tend to confirm that local information is a core part of the "humanisation" of the emerging technologies. The role of local and regional authorities is critical in achieving UK competitiveness. The emphasis on partnerships for funding from government and the EU is creating regional and local partnerships between education, TECS, Business Links, Higher and Further Education along with local authorities. This is assisting better local networks between business and the community which is central to economic and social regeneration. ICL is working with a number of these partnerships to identify Information Society strategies. Our work at South Bristol indicates the importance of engaging the voluntary sector in shaping the technologies, which is often overlooked.

What the new technologies mean in practise is that economies of scope grow in importance relative to economies of scale. Within a generation we are likely to live in a world where nowhere is more than a sixth of a second away. This is important in terms of how we think about outlying regions, for instance.

In the case of urban areas, the ability to improve the quality of the environment through reduction in urban transport needs and the delivery of services into the community needs to be thought through. Local and region authorities should be encouraged to develop Information Society strategies in partnership with TECS, BusinessLinks, Chambers of Commerce etc.

Q7.

Technology creates jobs and technology destroys jobs. The issue for the UK is that there could be a net increase or decrease through these technologies. Many industries, such as publishing, broadcasting and music where the UK is a net exporter with the underpinning of the English Language will face significant upheaval over the coming decade. It would assist the UK greatly if targeted awareness programmes were addressed to the areas of greatest threat and opportunity.

Teleworking which has been mooted for a long time, will become an increasingly real option for many people assisted by the much more natural and richer communications offered by broadband technologies.

There is an area which the UK should address, that of disabilities. The new technologies can be demonstrated to offer significant potential for enriching the educational potential of those with physical and psychological disabilities. Areas such as dyslexia, visual impairment and multiple disabilities have all been addressed by pilot schemes.

The ability to work "remotely" combined with the increased educational opportunities offers the possibility that many who are currently an "overhead" or "burden" on society can become net contributors. The social and economic consequences of action in these areas could be profound.

Also, with an increasingly ageing population retiring earlier, the new working patterns could allow individuals to remain active outside conventional employment. For those who retire through ill health or who take early retirement, the ability to work in a reduced stressed environment may be a viable option with the new technologies.

Q8.

As outlined at the start, there is a difference in approach between the USA and Europe. The UK's skills and innovation potential in publishing, broadcasting, distance education, animation, film and video technical capability, music and software puts us in a position where the US provides us with a window of opportunity.

Using the richness of European language and culture, for instance the Spanish language offers us routes to export back to an increasingly multilingual USA.

However, there are threats because of the sheer scale, speed and political commitment of the USA to the Information Superhighway. The UK could and should help to develop EU policies to counterbalance the potential domination of US products, ideas and culture. Because of our common "ownership" of the English language, and the traditional openness of our market, the UK will be the preferred first choice (after Canada) for US commercial and cultural expansion.

What would greatly assist the UK is the creation of a highly skilled and flexible workforce literate in the new technologies and their application. Without this capability, the UK will underperform against it's potential.

Above this, government could assist in the creation of some UK showcases—the support of partnerships between the media, technology, educational and commercial partners. There is no need to return to a policy of "picking winners". The issue is to facilitate partnerships across previously well-defined boundaries.

Governments principle role should be the raising of awareness and the stimulation of innovative SMEs able to exploit the creative potential offered by the Information Superhighways.

We are in an era of great uncertainty, where risk is a considerable factor in many potential projects. Our experience from South Bristol is that once people are made aware by direct experience of the technology, then they spot the opportunities. At the moment awareness is too low for a wide enough range of projects to come forward.

CONCLUSION

ICL hopes that we have been clear in our views on this important topic. We are of course happy to provide further input and evidence, where this can help the UK fulfill it's considerable potential.

10 January 1996

Memorandum by the Institute for the Management of Information Systems (IDPM)

SUMMARY

The IDPM is the professional organisation for the Management of Information Technology, whether by IT professionals or, as is increasingly the case, by user managers. It was formed in 1978 by a merger of the Data Processing Managers Association and the Institute of Data Processing and has 5,000 UK professional members controlling over £1.2 billion of IT spend plus over 5,000 student, overseas and practitioner members.

Many of our members have line responsibility for "making IT happen" in medium to large organisations, both public and private sector, but are not permitted to comment publicly on matters of policy and/or practicality. In particular, those in the public sector are commonly expected only to implement policy that has been decided elsewhere. For those policies to be sound it is essential that they are based on well-informed debate.

Experience over the past 30 years indicates that debate about IT matters, particularly in the public sector, is rarely well-informed and frequently avoids the political issues of choice and responsibility that must be resolved for successful implementation, particularly in times of change and uncertainty along multiple dimensions (social, economic and organisational as well as technological).

IDPM therefore believes it essential to stimulate public debate that is technically sound, financially and socially realistic, intellectually honest and conducted, as far as possible, in language that can be understood by the majority of the electorate. Hence the tone and content of this submission.

(1) Too much current debate is focused around the vested interests of current players and/or unrealistic expectations as to the value/immediacy of what the current generation of equipment and service providers can deliver. Not enough attention is being paid to the broader implications for Government and public sector when customers start to use the technology in ways which cause captive tax bases to fall significantly. If the "Global Information Society" is for real, then a growing proportion of "high-added-value" employment opportunities can be located in the most attractive places to live, transactions "sourced" from those with the lowest sales taxes and "profits" taken in those with the most attractive corporate tax regimes.

(2) Among the topics that need to be tackled are:

- —The need for UK Ltd (or Scotland Ltd, Wales Ltd, Yorkshire Ltd etc) to be able to compete for "high-added-value" employment opportunities which could be located anywhere in the world.
- —The changes needed in the organisation and funding of education and training when village schools or home students can access multi-national teleconferences and multi-media narrowcasts and providers, including publishers, programme-makers and examining bodies, will compete world-wide for paying students and customers.

— The Intellectual Property Rights issues that have to be tackled to encourage the development and dissemination of new and converging products and services when research may be teleconferenced and/or pirated world-wide.

— The rationalisation of the current UK confusion of regulatory authorities with jurisdiction over the converging technologies and services which could all too easily delay genuine indigenous multi-media super-highways (as opposed to over-hyped, inefficient and user-hostile, but also extra-territorial and unregulated, super-footpaths like the Internet).

— The growing vulnerability of large, network-dependent, centralised organisations (eg banks, retailers, manufacturers and others reliant on integrated, on-line, "just-in-time" systems) to sudden and catastropic collapse—whether from system failure or market panic.

— The social/fiscal/political issues that have to be tackled in a world where flexiworking (including direct to overseas employers) and teleshopping (eg world-wide e-mail-order over Internet) become the norm rather than the exception.

(3) All previous technology shifts (canals, railways, cars etc) have been accompanied by major population movements. Increasingly these have become international and not just local. High tax localities/governments could thus be left looking after the unemployed, uneducated and disabled on a declining revenue base. The solution is probably to find ways of skilling and employing the otherwise disadvantaged to provide co-operative/syndicalist/partnership life-styles which also attract "wealth-creators" to employ/support large numbers of ancillary/service workers.

Solutions based on traditional socialist/capitalist conservative/labour values are likely to be not only irrelevent but positively dangerous. Those which focus on avoiding information "haves" and "have-nots" and/or assume an élite of high paid "knowledge-workers" are popular in the UK academic community. But the falling cost of transmission and steady improvement in ease of access to information sources may well have a similar impact on the prestige and life-style of today's "knowledge workers" as the printing press had on that of medieval scholars.

Solutions should also assume a proliferation of "alternative life styles". For example we can already see "internet-based worker co-operatives" which compete directly with major corporations and use their earnings to fund community projects, research programmes and/or other "goods works" rather than merely to make money to pay shareholders. Should this spread it poses a major threat to the pension funds and insurance companies which now own the majority of corporations.

(4) If that vision is correct, then UK economic survival, let alone prosperity, needs the restoration of the pre-war (and pre-nationalisation, centralisation and privatisation) kaleidoscope of:

— municipal and local enterprise (public, private and partnership).

— devolution and federalism (rather than central control/planning).

— co-partnerships and co-operatives and not just limited companies and multi-national corporations.

— central government pump-priming rather than provision (of the Royal Mail contracts that under-pinned the financing of politically and socially desirable steamship services and railway lines).

— the use of government rather than regulation to promote best practice.

— the end of rule by statutory instrument (originally for emergency powers only).

— a return to the assumption that many, perhaps most, public sector activities may be better done differently in different parts of the UK with local funding and democratic accountability.

(5) A key message from the fiscal problems of the current Government is that the centralised, standardised, bureaucraticised, UK state, largely the creation of two World Wars, which has grown remorselessly outside Parliamentary control whichever party is in power, can no longer fund itself at a price that the UK private sector can afford to pay.

A bonfire of regulation, planning and control may be the only way of stimulating the growth in new and alternative employment that is necessary to avoid widespread social pain and disorder as traditional jobs and careers are destroyed throughout the private sector and falling tax revenues will no longer fund conventional public sector services and/or welfare schemes.

(6) While IT can undoubtedly be used to greatly reduce the cost and improve the quality of government (eg the merging of income tax, national insurance and social security into a single intelligible system) it may be that good quality health and welfare services for an aging population can only be afforded by using IT to support local, decentralised and networked services provided to revitalised local authorities by co-partnerships rather than by hierarchies of agencies, quangos and trusts reporting to central government.

RESPONSE TO THE SPECIFIC QUESTIONS ASKED

1. *What is the Current Form of the Information Super-highway*

1.1 The nearest to a "current form" of "Information Superhighway" (defined as a publicly accessible network capable of transferring large amounts of information at high speed between users), is probably the low cost ISDN services available in France, Germany and parts of the United States. Because of regulatory restrictions (for example BT is not permitted to provide a fully integrated ISDN service, as opposed to raw ISDN connectivity) there is no such widely accessible equivalent in the UK. The combination of ISDN and Internet Protocols over dial-up or leased circuits ("Intranet") is both powerful and reliable. The Internet, a heterogenous agglomeration of many different types of networks and no certainty or confirmation of delivery, may be very useful but is not a "super-highway".

1.2 SuperJANET might have the capability of developing into a true Information Superhighway but, if so, this will be largely because of the way in which it is trunked not only over BT lines but also over Cable Networks which also serve major industrial complexes. For example the SuperJANET link to Brunel University is provided by General Cable who also provide even more powerful data transmission facilities to some of the High Technology companies on the Stockley Park estate adjacent to Heathrow Airport. The difficulty of agreeing a charging structure under which the carriage of commercial traffic can be used to help fund the expansion and development of SuperJANET is probably a more significant obstacle than standards issues.

1.3 The nature and timing of the growth in availability and demand for multimedia products and services, whether or not trunked over broadband super-highways, is much misunderstood. We are already seeing the start of a possible boom in electronic marketing over the Internet and other less sophisticated but more reliable networks. This is likely to transform parts of the retail, distribution, insurance, banking, financial services, travel and transport industries and also have knock-on effects elsewhere. It is, however, largely based on current technology.

1.4 Recent experience with Internet "brown-downs" will greatly expedite the transition to properly engineered and charged commercial services (CompuServe, PIPEX, BT Easylink, AT&T Interchange etc). Even enthusiasts will not tolerate the six hours response times reported when a new Japanese user tried to broadcast a message to everyone at a time when NASA had reclaimed its circuits, part of the main US backbone, for on-line telemetry between ground stations while it had a space shuttle in the air.

1.5 Experience to date with broadband and/or full multimedia is equivocal. For example one trial was a technical triumph but a commercial catastrophe as customers clogged the point-of-sale, browsing through a superbly informative, responsive and attractive system (which mixed local CD-ROM, full inter-active disc and an on-line transaction service), rather than making purchases.

1.6 Systems now being shipped will handle attractive multimedia applications based on CD-ROM files and/or ISDN transmissions. Low cost (£500), broadband (10 mb), modems for linking to cable and digital TV networks are available. Current CD-ROMs are, however, inadequate for attractive moving image if the consumer comparison is with a VHS cassette. Meanwhile even the new generation operating systems are several orders of magnitude too slow for the convergence (as opposed to parallel display) of moving image and data.

1.7 Even the proposed standards compare poorly with current analogue video quality. JPEG crackles with errors and has to be down-loaded to a big hard disc for full motion replay. Under similar error rates MPEG and even MPEG2 have an oddly smeared effect, as though water has been thrown on the screen and wiped off, and require special cards and separate fast forward and reverse tracks.

1.8 The cost of generating original video material, as opposed to reformatting existing archives, also remains high. The cost of storing it digitally for on-line transmission may also remain uneconomic for many years. It may cost only $2–300 to digitise a movie but it still costs $5–600 per copy to store it on a jukebox of 2.1 gigabyte hard drives (six movies per drive) for access by "video dialtone" over an inter-active cable network—the US equivalent of the BT video-on-demand pilot. Hence the interest in promoting "near video-on-demand" with choice limited to the current top-10 titles, time-shifted, rather than a library of 5,000 or so titles.

1.9 The mail-order catalogue, illustrated book and/or entertainment video are still too cheap and user-friendly compared to the CD-ROM equivalent except where rapid price/product changes, complex indexing and/or inter-action are involved. Low resolution multimedia electronic mail-order, maintenance manuals, distance learning material, sales aids and games will all generate sharply growing revenues and employment over the next few years and grow through the next recession but the explosive growth of wholly innovative, high resolution products and services generating hundreds of thousands of new jobs is still in the future.

1.10 Within 10 years, however, it is probable that the cost of generating special effect graphics of the quality used in Jurassic Park will have fallen by a factor of at least 1,000, CD-ROM or equivalent will hold days of high quality moving image and broadband digital transmission to the majority of homes and/or workplaces will be a reality.

1.11 We can see the likely trend by looking at the "simpler" area of voice-processing. This autumn has seen the announcement of a variety of voice processing and response systems with limited vocabularies driven by processors with power in the range 10–20 mips. But 1–2,000 mip processors are currently needed to decypher "I'll take the, ah, burger, no make it the mcnuggets". Given 2–10,000 mips we can already do simple, albeit slow, automatic translation using limited vocabularies in specific application areas (eg AT&T's Video English Spanish Translation [VEST], for simple bureau-de-change currency conversion). Realistic processing, capable of handling regional accents and multiple applications probably requires millions of mips.

1.12 The availability of cheap mips and bandwidth is growing every year. The main limitations are the exponentially more complex software needed to process voice and image over interlinked networks of modular platforms and, even more difficult, the need to meld the cultures of IT, telecoms, broadcasting, publishing and artistic presentation to create products and services that customers will buy at prices that will make the investment worthwhile. As Arno Penzias, head of research for AT&T puts it: "the real problem is getting people to communicate, all the rest is mere technology".

1.13 That combination will eventually transform the market place as the television, video-recorder and multimedia PC finally merge into a domestic work-station that will make the children of 2010 look on a Windows 95 System much as the children of today look on a Sinclair ZX80. The production and use of a wide variety of low-cost products and services to exploit that technology will almost certainly be one of the main driving forces behind the next IT skills cycle but the transition will be far more radical than that to Windows 95 and/or its competitors and/or its immediate successors.

1.14 There is therefore likely to be a significant hiatus as even Microsoft and its competitors, let alone their customers, seek to derive benefit from their current investments rather than jump to the next technology. That hiatus could exacerbate a predicted world-wide recession (shortly after the millennium) as productivity increases lead to continued job reductions in developed economies before these are countered by the need to expand agricultural production to feed the growth of the mainland Asian economies, and consequent economic recovery in the US, Canada, Australia, New Zealand etc. One of the main driving forces behind support for the Global Information Society initiatives in the United States is therefore to try to expedite the new wave of job creation and ease the pain of transition.

2. *What services are being provided*

2.1 Mark Barker (formerly Head of BT International, now Vice President Global Strategy and Operations for AT&T) has classified the markets world-wide as:

- Content and Hosting: on-line information services, electronic shopping and publishing, entertainment, education etc
- Communications services: long distance, local and emerging (including mobile and satellite)
- End-user software, services and equipment: from Windows and PCs through ever more intelligent phones to TV and set-top boxes
- Systems integration: to weave the above into seamless services for the customer.

2.2 A very wide variety of services is being developed throughout the world. The publicity given them is probably in inverse proportion to current economic value. The largest, in financial turnover, are those serving specific markets, eg insurance, the vehicle industry and retail and distribution, both locally and world-wide. Education and training are well behind, except for the use of video and/or broadcast lectures and demonstrations by world-class experts on leading edge topics. A comparison of multi-media packages at the BETT show in January 1996 with the paper equivalents from the same publishers indicated that the paper based material remains cheaper and more attrative for many applications. The fragmentation of planning and procurement and slow and idiosyncratic decision processes mean that the UK public sector, particularly in health and social services, is not an attractive market for most commercial providers.

2.3 Discussion in the UK appears obsessed with the technology while that in, for example, the United States, is far more focussed on what services users want and will be prepared to buy, at what price. In consequence the range of material and applications already available over the existing broad-band and ISDN section of the Internet in the United States and over their "Video Dialtone" and "Metropolitan Area Network" experiments is far greater that that in the UK although some of the UK services *may* be more technically advanced.

2.4 The more important task is to persuade the majority of users to upgrade from the "Internet" (an agglomeration of services of varied quality and reliability, including some best described as "actively user-hostile", running largely over standby capacity which may be called back by the US DOD, NASA, NATO or PTTs at little or no notice) before the widely expected consumer backlash (against current content, response time and difficulty of access), does too much long term harm to the underlying concepts.

2.5 The problem perceived by the main US players is to find and fund the means of moving the bulk of non-academic users from low bandwidth Internet at 0.5–1.0 cents an hour (on standby capacity) to 1–2 cents an hour (on properly engineered and supported commercial services) and then (probably using ISDN as a transitional stage to whet the consumers appetite), to move them to full broad-band motion video of VHS standard at no more than 20 per cent more than the cost of a current voice transmission of equivalent time duration. The expectation is, of course, that video transmissions will be much longer so that the revenue base will grow at considerably more than 20 per cent before allowing for content charges and/or add-on services.

2.6 This is an economic and commercial, rather than a technical/legal challenge. The key task, as defined by Peter Stuntebeck (Divison Managers, Next Generation Services and Technology Applications within Bells Labs) is to find "fat/sticky/addictive (minutes, bits, transactions) applications", identify the opportunity, make the case and champion the necessary innovation.

2.7 The economics of the cable TV, terrestrial and satellite broadcast, film and video distribution, mail order, publishing, news and information service, telecoms and computing hardware and software industries are all different and the valuations underlying the current round of take-overs and mergers indicate that most players have unrealistic expectations. They all seem to think the grass is greener on the other side of the fence. The consequent shake-out is likely to be very painful.

3. *Who will supply those services?*

3.1 The "global alliances" already in place or under negotiation bring together a wide variety of types of organisation (competitive corporations, government agencies, statutory corporations, licensed monopolies etc) from an equally wide variety of backgrounds (broadcasting, telecoms, publishing, film and programme making, news and information services, computing hardware, software and service providers, aerospace and equipment suppliers, consumer goods suppliers, retailers, distributors etc).

3.2 Investment in the UK communications infrastructure (except for BT and Mercury) has, since the termination of 100 per cent capital allowances, been almost entirely through US, French or Canadian off-shore vehicles. The advantages for UK investors of routing capital intensive investments, whether in infrastructure, or content, through a United States Corporation able to offset such investements in full against State and/or Federal tax bills will ensure that this continues to be the case. It is equally no accident that the electronic publishing operations of most UK owned "world-class" content providers (eg Reed Telepublishing) have commonly been moved to the US while even scientific abstracting services are commonly moving to the Far East to reduce labour costs.

3.3 US expectations are that there will be a "post-deregulation Clash of the Titans" in the course of which the 50 or so largest players in the Telecommunications, Broadcasting, Computing, Entertainment (including films and games) and Publishing industries will converge into four or five competing world-wide groups—each employing armies of specialist sub-contractors. The main reason that there will be at least four or five competing groups is fear of anti-trust action by the US Justice Department.

3.4 The development and consolidation process will probably be akin to that followed by the US "movie" industry through the 1920s and 1930s with dreams, delusions of grandeur and unrealistic expectations on all sides and many more players going broke than survive.

3.5 The technologies may be converging rapidly but the people are finding it much harder and there are many clashes of culture and profession to be handled. The management styles and techniques that will be needed also appear akin to those of media production where a wide variety of skills need to be co-ordinated to timescale and budget to produce a one-off for mass replication and distribution. Meanwhile the investors will often remain uncertain whether they will become rich or bankrupt until after the event unless practices "to make the markets more predictable" are sanctioned by the FCC and/or or condoned by the US Justice Department and Courts and the equivalent "Regulators" in the UK and Europe.

3.6 Service standards will probably be driven by the recent US recognition that at least 80 per cent of the population will never pay for products that are more complex to handle than a TV Zapper and that such a device is probably all that is needed to handle the most profitable 80 per cent of applications. The device (or the domestic Phone/PC/TV derivative to which it locally transmits) may well need several thousand MIPS (millions of processes per second) to handle the accompanying voice response commands but much of the necessary software and technology is already being embedded both in telephone "centrex" switches in the US and small firm PABXs in the UK.

4. *How can universal access be best assured?*

4.1 "Universal service" and to whom it is provided needs to be separately defined for the domestic, public service and business markets. Whatever definitions are used the basic choice is between open and transparent cross-subsidy (whether from general taxation or specific "telecoms taxes", such as that proposed recently by Oftel to pay for cheap educational access) and hidden cross-subsidy (as in connections for schools in return for the early removal of regulatory restrictions on BT proposed at the Labour Party Conference).

4.2 The arguments as to which alternative is most likely to be effective are clouded by multiple vested interests. Many of the costings used are of little value. It may well be that services to remote locations will soon be served by satellite based, broad-band digital radio more cheaply than many inner city locations can be served by terrestrial cable. In the US the telecommunications services to remote locations have for many years been explicitly subsidised from Federal (eg US Department of Agriculture) and/or State funds.

4.3 It may be that in the UK a telecoms tax (alias universal service fund) should be introduced to ensure a basic service, akin to that of current ISDN, to all customers (business or domestic as well as educational) in the UK, in parallel with the removal of restrictions on BT. Either way, if Oftel can mount a consultation process on the issues that is half as constructive as that organised by Vice-President Al Gore's National Information Infrastructure Task Force, the results will progress public understanding on the broader issues as well.

5. *What is the role of Central Government?*

(i) Leadership

IT Year (1982) focused UK debate on IT related issues in a way which no DTI "awareness" campaign since has come anywhere near achieving. Perhaps this is because none of the campaigns since has been organised in the same way, with the same degree of leadership and commitment from both industry and government.

Al Gore's "National Information Infrastructure Task Force" (NIITF) in the United States, with the administrative support provided from the Department of Commerce, but driven by the leaders of industry and cutting across departmental and regulatory boundaries (both Federal and State), is now fulfilling a similar role in the United States.

The UK need today is to combine the two approaches (IT Year and NIITF) with a major national exercise to produce an agenda for action focused on the pre-conditions for the successful development and application of IT, including the skills needed at all levels by both the suppliers and the users and the need for government (not just DTI) to remove the legal and political barriers to implementation—as opposed to "mere" technology awareness and/or bids for research funding.

We need a programme, sustained over time, that combines the best features of IT Year (1982) and Vice-President Al Gore's "National IT Infrastructure Task Force".

(ii) Promoting inward investment

The priority should be to reform the UK Corporation Tax regime to promote indigenous risk investment rather than to promote inward investment "merely" because our current tax regime encourages UK institutions not to undertake risk investment in the UK.

It was no coincidence that UK domestic investment in both the cable industry and film production stopped dead when 100 per cent capital allowances were withdrawn.

If UK pensions funds, banks and other financial institutions are to fulfil their legal obligations as trustees of the nation's savings they have no choice other than to route any risk investment in capital intensive projects, whether infrastructure or content, through US corporations where they can claim full tax write-offs unless and until the investment has indeed paid off.

Routing capital intensive, high risk investments through UK companies under the current corporation tax regime, whereby substantial advance corporation tax may be paid whether or not the investment ever pays off, would be gross dereliction of duty on their part.

(iii) Promoting and safeguarding the interest of UK firms world-wide

"Muscular reciprocity", as proposed between in the UK and US in the recent report of the PITCOM study tour to look at US Super-highways policy, is essential.

This needs to include working with our European partners to secure the necessary critical mass to stand firm, when necessary, against US extra-territoriality claims.

We need to recognise that most US players regard the Far East as a more important market than Europe and that China, rather than Japan, is seen by them to be the key economy of the future.

(iv) Promoting Network Compatibility

The main need is for active government support for UK standards activities to ensure that all public sector services and applications (hardware, software and content) are capable of de facto inter-working. There are major problems in this area, for example with the "routers" being installed into schools and colleges, as well as businesses, so that traffic may be sent over different networks according to current price and quality of service.

Effective action will entail ensuring the UK USER view is well represented in the world-wide consortia (eg the Franco-American W3C consortium) that have effectively replaced most formal standards authorities in this area.

Explicit government support for organisations like SITPRO and BSI DISC, to enable them to represent the needs of UK users, public and private, large and small, is therefore essential.

(v) Access to government information

The problems are political more than technical.

At one level the main issue is the reform of charging for material that is Crown Copyright. Should the taxpayer have to pay twice over? Should material of commercial value be available at no charge to non-taxpayers? Should different policies apply to different types of information (eg Hansard and Statutory Legislation at no charge and statistical material charged, other than to those required to contribute to it)?

At another level the need for a "Freedom of Information Act" as was timed out in Spring 1979.

At another level the need is to remove the legislative and administrative obstacles (created ostensibly to protect civil liberties and the private sector) that commonly prevent Government Departments from sharing information and networks respectively and thus impose a major cost and inefficiency overhead at all levels (both central and local).

Until these issues are tackled the massive potential savings, let alone equally dramatic service and efficiency improvements that could come from the sharing of networks and information, between the various parts of government, central and local, policy and agency, cannot be realised. In consequence your medical records, for example, will remain scattered over filing cabinets in every surgery and hospital that has ever treated you (unless they have been lost in between).

(vi) Security of Payments

The technical and standards issues can probably be left to the suppliers provided Government acts rapidly to set the necessary legal framework, particularly with regard to the admissibility of electronic evidence in court, so that international electronic contracts will commonly specify adjudication under UK law (ie in London in preference to New York, the most common other specified jurisdiction in current international contracts).

Without such action the administration of secure world-wide payment systems will almost certainly migrate to the United States and the "cyber-dollar" will be in common circulation well before the Euro.

(vii) Data protection, confidentiality and censorship

The need is to ensure that existing regimes for computing, communications, media and publishing are adapted rather than replaced. The risks of driving publicly acceptable operations off-shore and of forcing legitimate service providers to use routines that are vulnerable to organised crime, as a result of over-regulation, are significant.

The Franco-US policy of not permitting the use of encryption algorithms that their security agencies cannot break (akin to the introduction of Royal Mail so that Charles II's spies could open the correspondence of potential trouble-makers) renders business vulnerable to the attentions of the many former members of the KGB as well as of equivalent Western agencies who are now operating in the private sector as a result of defence cutbacks.

There is a major need to clarify the legal powers and responsibility for monitoring and tracking illegal transmissions (from paedophile rings to those concerned with the organisation of drug-trafficking, terror or fraud) which may travel across a wide range of networks and jurisdictions from originator to receiver.

(viii) Verification of information

This is linked to security of payment, the admissibility of electronic evidence and, significantly, data protection. The most secure current technology involves the use of write one, read many (WORM) technology to produce an ineradicable record of all amendments (including those to correct past mistakes). This is probably essential to ensure that, for example, subsequent legal action is based on the correct version of an agreement that may go through many networked drafts, amendments and changes over time. This has the side effect that there may also be a permanent record of information that should have been revised or deleted under data processing legislation. A classic example is the Nixon "Watergate" Tapes—"erased" but not physically over-written.

There have also been major advances in, for example, on-line signature and fingerprint verification but more widespread adoption depends, at least in part, on action regarding the admissibility of electronic evidence in court.

(ix) Promoting the development of UK-oriented software?

The "orientation" of software (whether computer software or media content) is determined by a mix of the customer base for which it is designed and the fiscal regime, skills base and other factors that determine where it is produced. The UK still has a world-class publishing industry but most of those involved have moved the bulk of their electronic publication operations to the US for a mix of marketing, fiscal and production reasons.

In a number of areas the US lead depends to a large degree on the quality of the UK educated and trained ex-patriot staff who occupy key roles throughout their media, communications, hardware and software industries. That lead could well increase with the use of the UK by US cable and communications players as a low cost/risk test bed for technologies that they may, or may not, decide to roll out in their domestic markets.

Any UK Government action is likely to be a waste of time and effort unless and until the fiscal issues that deter large scale, private sector, risk investment through UK-based companies are addressed directly and effectively.

6. *The role of local and regional Government*

A prime factor in the economic prosperity of Victorian England was the way in which independent municipalities competed as places do to business—bringing together a mix of Sunday schools through mechanics institutes to civic universities to develop their skills base while fighting to have canals and railways pass through (rather than away from) them.

Similar competition can be seen today between the States of Germany or America as they fight each other to be a "location of choice" for the jobs of the future. Arguably the best, and most successful, model is the regeneration of North Carolina from a group of depressed cotton centres surrounded by swamp-land to an area where high tech researchers and entrepreneurs wish to rear their families and therefore locate their businesses.

The original order of priority for the State Government of North Carolina was: law and order, education and family health-care in parallel with the development of an under-used (and therefore queue free) international airport as a "hub" and focused campaign to attract a critical mass of high-added value jobs in specific growth sectors.

7. *Impact on working practices and employment prospects*

Corporate Implosion

7.1 The successful application of IT has led to an overall implosion of corporate career structures. Much of the analysis and information processing that used to occupy tiers of middle management now resides somewhere inside a computer system. The on-line "supply chain management systems" that link supermarket checkout, distribution warehouse and suppliers have, for example removed armies of clerks, administrators and their managers, not only in retailers and distributors but also in suppliers and transport firms. Similarly in banking and insurance the move to automated teller machines, credit cards and on-line transactions and telephone banking has led to massive staff cuts, including among the managers whose decision support systems are supposedly to be networked and supported. The effective use of "groupware" often leads to the reduction or elimination of the group as the task is streamlined, optimised and/or built into the system.

Globalisation

7.2 The pressures of global competition also directly affect many areas of current and prospective IT employment. Many Indian software houses are now fully competitive on quality and their prices are way below the Western equivalent. The use of Chinese and Filipino data entry operations by new market entrants is bypassing the intellectual property rights of established information providers and may change the economics of database publishing.

It is as well to remember that throughout history, until the last century when it fell apart in civil war, China was by far the world's largest economy. Many US corporations are basing their long range planning on it again being the world's largest economy, within a decade of the millenium. They are assuming that it will have a dominant position in many of the industries of today, including the bulk of routine "information processing" and "database maintenance" jobs.

7.3 If the "Global Information Society" becomes a reality a number of consequences follow:

- information collection and processing jobs that do not require scarce skills can be located where labour rates are lowest.
- "High-added-value" tasks that require scarce skills can be located where there is the best supply and/or in the most attractive places to live.
- transactions can be "sourced" from the areas with the lowest sales taxes and "profits" taken in those with the most attractive corporate tax regimes.

7.4 We can already see the trends starting with electronic publishing and information services, in particular, following many financial services "off shore". One of the effects of the European Union is that a growing number of citizens live in one state and work in another. The combination of flexible working (from home, office and/or data mobile) and the Internet means that IT professionals may "work" in a number of states, not merely in Europe but world-wide, in the same day or hour.

7.5 The globalisation of IT related businesses and jobs presents many challenges. Some of these provide opportunities for IT professionals; others require them to diversify their skills sets to increase their probabilities of future employment, let alone prosperity. These include:

- The openings for those who look to the world-wide English-speaking education and training markets whose products may sooner or later swamp the educational idiosyncracies of the English and Welsh (National Vocational Qualifications, GCSEs, National Curriculum et al).

  The organisation and funding of education and training are transformed when village schools and/or home students can access multi-national teleconferences and multimedia "narrowcasts" and providers, including publishers, programme-makers and examining bodies, compete world-wide for paying students and customers. Who will exploit the opportunities? How?

- Many intellectual property rights issues have to be tackled to encourage the development and dissemination of new and converging products and services when research may be teleconferenced to participants scattered across several continents and/or simultaneously pirated world-wide.

  A number of IT professionals have done very well by acquiring legal qualifications and/or changing careers. Others may do even better producing and running the systems and services to police and collect royalty revenue from the licensing, copying and/or performance of multimedia products and services.

- The current UK confusion of regulatory authorities with competing jurisdiction over converging technologies and services could all too easily delay the development of our phone and cable networks into indigenous multimedia super-highways (as opposed to over-hyped, inefficient and user-hostile, but also extra-territorial and unregulated, super-footpaths like the Internet).

  But it also provides niche operators with opportunities to exploit overlaps and inefficiencies that are barred to much larger players.

- There is a clear need to reduce the vulnerability of large, network-dependent, centralised organisations (eg banks, retailers and just-in-time based manufacturers) to sudden and catastrophic collapse—whether from system failure, fraud or market panic.

  The professionals who specialise in this area already do very well. A classic example is the many disaster recovery services that need regular maintenance and testing but will, hopefully, never be used in earnest.

- Many social/fiscal/political issues have to be tackled to prepare for a world where flexiworking (including direct to overseas employers) and teleshopping (eg world-wide e-mail-order over Internet) become the norm rather than the exception.

  But until governments get their act together "free-traders" can exploit all the loopholes and inefficiencies. Thus the basis of many US Internet retailing operations is simply toll-free electronic mail-order from the state with the lowest sales tax for delivery by Federal Express.

The Teleworking Trap

7.6 There is a sharp rise in flexiworking: working from home office linked to the corporate systems but having regular physical meetings with colleagues and/or customers and using company premises and facilities for what cannot be done economically from home. A significant part of the rise in demand for "Groupware", wide area and other networking and communications skills is to provide the technical support that is necessary. This is also a major driving force in improving the usability of many communications products and services. User interfaces which look fine to an "Internet junky" may be wholly unacceptable to senior managers logging in from home, airport or customer premises.

7.7 Flexiworking is, however, very different from teleworking: where the individual does not regularly communicate other than electronically or by post. Given the growth of low cost world-wide networking a grim fate awaits the teleworker without the skills and/or knowledge to have a competitive advantage over the Indian or Chinese post-graduate bidding to do the same task.

7.8 The key factors affecting the desirability or otherwise of working from home for the individual include the distance from colleagues/clients, the scarcity or otherwise of the skills they possess and the means of enhancing/updating their personal skills base.

7.9 Individuals who intend to telework regularly from outside easy "travel to meeting" distance from colleagues and/or clients, without maintaining a skills and knowledge base that will ensure their personal "competitive advantage", risk becoming trapped in old fashioned rural squalor rather than enjoying the ideal of a beautiful lifestyle.

7.10 "Travel to meeting" distance is better measured in hours than in miles. Thus a Scottish island with an all-weather air taxi service can be seen as "closer" to London than many parts of England and Wales. It is no coincidence that many of the new Internet-based businesses are located in locations which may be geographically remote but have excellent air transport.

7.11 The potential for many IT-related jobs to move off-shore cannot be overstated. If the task can be adequately specified (eg transporting a legacy system from mainframe to client-server or PC/LAN with little or no change), an Indian Software house may already be able to bid at 20–25 per cent of the UK/US price for comparable quality. Even if the job requires on-site attendence and local support, it is now common for the supposedly local supplier to sub-contract those tasks which do not require such close contact overseas. More recently the scale of subcontracting to China has increased dramatically, including for scientific abstracting and information collection and collation as well as for complex programming, particularly that requiring object-oriented thinking—which comes naturally to the classically educated Chinese.

What are the Jobs of the Future

7.12 Both the UK and the US have a major need for Japanese style "scenario planning" to help identify the likely mass market products and services of the future and thus both the technologies and skills to be fostered.

7.13 We may joke about some of the Japanese "concept" projects but many have been remarkably far sighted and successful in enabling continued dominance of markets where Japan has no natural advantages. Even the "intelligent toilet" (which auto-analyses stools and urine) turned out to be a profitable product (albeit one sold almost entirely in the domestic market).

7.14 The only known UK attempts to follow a similar approach were those supported by Basil de Ferranti in 1978–79, 1981–82 and 1983–84.

The job forecasts that came out of the 1979 exercise included:

Losses: up to two-thirds of all clerical and administrative staff

Gains: Industrial: including

computer controlled car-tuning devices

revival of made-to-measure clothing

medical care devices

information handling devices

— Services:

24 hour customer service

fewer clerks more street-cleaners

fewer secretaries more nurses

The job loss and creation forecasts for the private sector were based on the known long-term plans of major corporations. Those for the public sector proved to be much less accurate, even before the automation of street cleaning.

7.15 The job forecasts produced for the 1982 Barbican Conference that concluded IT Year were, in part, based around the premise that "If we do not make better use of the technology to create more wealth and simultaneously release and equip manpower to take better care of the elderly; you and I will grow old and cold alone, in the dark."

They were revised for republication in 1984 and can be divided into two main groups:

— The UK end of the Global Information Society:

Wiring up Britain (interactive cable video and switching)

50,000 temporary jobs for 5–6 years

Maintaining the video network

no net gain or loss after transfer from telecoms

Producing entertainment and leisure material and services

750,000 net after transfers from TV, publishing etc

Education and training material service

500,000 net after transfers

Information services (including home shopping and ordering)

400,000 net after transfers

Even in 1984 the forecasts of net job creation related to the installation and maintenance of a truly interactive cable network, what we now call a superhighway, were at best neutral, after a hump of temporary jobs building the infrastructure.

The positive forecasts for materials assumed the low cost production of a wide variety of what is now called "multi-media" and not just the cheap availability of a limited range of old films.

The forecasts for information services included not just abstracting material to go on to database services but all the service workers needed if you no longer drive to the hypermarket to physically pick, pack and collect your own shopping.

However the spin-off group of new employment prospects was much larger.

— Spin-off/Other potential

Sheltered retirement homes and private personal care services, up to 1,000,000 net.

Medical equipment and services (including powered limbs, monitors and controls to aid personal independence for the elderly, frail, crippled), 250,000 net gain.

Enery conservation and alternative energy sourcing, 500,000 net gain.

Material and resource recycling, 250,000 net gain.

Security systems, 100,000 net gain.

Energy and land efficient (not just labour efficient) agricultural production, 250,000.

Walking machines, electric vehicles etc, no net gain/loss after transfers.

The net effect, before considering the earlier retirement, part-time work and expected shrinkage in the population of working age, was a return to full employment. The proviso was "whether our society still has the ability to cope with fundamental change, to create whole new industries and to redeploy manpower, machines and resources on a massive scale. Our ancestors could do it . . . but the Ancient Regime of France provoked a revolutionary bloodbath when it tried to copy Britain's early industrial revolution without understanding the forces which made it possible."

Already in 1984 forecasts, one of the assumptions was that the elderly might well spend their savings on a mix of personal care and technology to acquire another decade of active life rather than leave them to their children.

7.16 In 1995 the WEFA Group did a major study on the Economic Impact of Deregulating US Communications Industries. They predicted that "immediate regulatory relief" would generate 3.4 million net new jobs over next 10 years.

- Manufacturing, 498,000;
- Construction, 423,000;
- Wholesale and Retail, 923,000;
- Services, 1,400,000;

and that unemployment would fall to 5.0 per cent in 2005 with $1.8 trillion more real GDP, $900 billion more real disposable income and $8,500 more disposable income per household.

The down side was that a three year delay would cost 45 per cent of the benefit and a five year delay would cost over 55 per cent of the benefit.

In the United States one in six of all jobs is already telecoms related. Their forward planning scenarios appear to assume that the bulk of routine information jobs, from journal abstracting through to object oriented programming will migrate across the Pacific to the Phillipines, Guandong or Bombay.

Despite this, the wealth creation and employment forecasts of the corporate players who drive Vice President Al Gore's National Information Infrastructure Task Force are bullish. But those forecasts depend on moving faster than the Asian Economies in many key areas and on the agricultural revival that will take place in the US as China begins to generate wealth and consequently becomes a net importer of food.

7.17 One of the early conclusions from the PITCOM Study Tour of the US was the need for forecasting exercises that brought together the Japanese style scenario planning exercises supported by Basil de Ferranti and quoted above with the approach of the US WEFA Group.

8. *Is the dominance of mass-market US software a threat or an opportunity?*

The challenge is to match the US players on price, attractiveness, ease of use and marketing and to beat them on quality of content in those areas where we aim to compete.

We will not succeed in this until we address the confused mix of UK regulation and taxation (corporate as well as personal) which currently helps ensure that much of our brightest talent is working in the US helping develop their products and services funded by our pension funds and financial institutions in order to meet their moral and legal obligations as trustees for our savings.

Memorandum by the Institute of Management Services

SUMMARY:

An information superhighway can be an important contributor to economic regeneration and to maintenance of competitiveness on global markets. It is also a source of new opportunity in those markets, an opportunity which the UK with its long tradition of effective education and service

> provision, is well-equipped to exploit. However, to ensure maximum benefit, and to avoid the problems of creating an information underclass, the infrastructure needs to be planned as a national, coherent, all-pervasive infrastructure. There is a wide range of potential services, which can be market-led and differentially priced but the infrastructure should be all-pervasive and equitably charged at a rate which makes it available to all.

The Institute of Management Services is a professional body representing the interests of some 6,000 individuals involved in the promotion and development of productivity and quality. As part of our commitment to continuing review and change of working practices and processes, we are keen to ensure that UK industry and commerce is able to take advantage of recent, and imminent, technological developments. At present such exploitation is, to a degree, hampered by the inadequacy of, and charging associated with, the telecommunications infrastructure. In particular, the convergence of various signals into digital form (voice, data, fax, video, etc) means that a high capacity, digital infrastructure is vital. The UK has been particular slow to adopt ISDN technology—because BT, in particular, has a charging policy which involves high installation costs. However, ISDN is, at best, a stop-gap technology: it does not have the capacity (in terms of bandwidth) for the multimedia signals of today, let alone tomorrow. The likely technology of a true superhighway is likely to be ATM (Asynchronous Transfer Mode) the subject of a number of experimental services in UK Higher Education and industry. Certainly, the medium is fibre optic cabling—increasingly being used for national trunk networks by telecommunications providers, and for local networks by cable TV/telephone companies and others. AS with the Internet, any UK information superhighway is likely to be a conceptual linking of a number of disparate networks, some of which are in existence already. Thus, in some cases and areas, all that may be necessary is to create the appropriate regulatory framework to encourage and foster inter-connection.

However, in other areas, there will be a need to create the local networks for interconnection into the national network. Without a national, coherent policy of infrastructure provision, there is a danger of particular geographic, or industrial areas/sectors becoming “information rich” but leaving an information underclass. One advantage of effective telecommunications and information provision is that it makes a major contribution to evening out opportunities for education and employment. The range of applications for an information superhighway is too great and too important to allow an uncontrolled and purely market-driven approach to infrastructure provision—although it is accepted that the provision of information and related services ON that infrastructure will be, in part, market driven. This is analogous to the fact that we all expect to be provided (at an even and equitable rate) with basic connection to normal household services including telephone and television—but we may be willing to pay an additional access charge for special or premium services.

Thus, infrastructure provision must link together the various communities—with perhaps special consideration being given to schools, colleges and local government. One advantage of this is that it can increase the accountability of local government to its electorate by allowing the rapid and easy interchange of information and comment. Of course the same is true of national government: the government information service has made valiant attempts to exploit new information technologies and increased use will lead to an increasingly aware populace that can more readily take part in key decision-forming processes.

Of course “regulatory framework” carries both positive and negative overtones. The “hand on the tiller” must be fairly light if we are to expect commercial organisations to invest heavily in providing elements of the infrastructure.

Once the infrastructure is in place, we can expect service providers to rapidly find means of exploiting it. The UK has a good track record of providing services, and still has a reputation for effective education and innovation—both likely to benefit enormously from an information superhighway. A truly national infrastructure would mean that certain educational and training service could be provided as cheaply in remote, and perhaps presently disadvantaged, areas as they could in major conurbations. In this sense, the information superhighway can be seen as a means of empowering citizens and increasing choice. Of course, the same services can (assuming that the infrastructure includes effective overseas links) be provided to overseas customers. Here, our language gives us a considerable advantage over most of our European partners in that there is a large market in the Far East looking to benefit from education and information services in the English language.

There are still problems to be resolved. The development of an effective information-based economy relies on a fair legal framework for the development of such services. At present, certain parts of that legal framework, for example that associated with Copyright and other liabilities, are struggling to keep abreast of changes in access and usage methods brought about by the new technologies. As ever, it is important to balance the needs of the information providers with those of the users.

We operate in a global information economy. As with all other such economies, the UK has to identify where its particular markets lie—where it has particular expertise that provides a competitive edge. We are well placed to exploit an information superhighway. Of course, an important consideration is the benefits it can bring internally—both economic and social, cultural and political. The applications are, in many cases, waiting for the delivery mechanism; certainly they will readily appear. It is up to government to ensure that provision of the infrastructure creates an equally advantaged society that can use the available services to update its skills and take advantage of new opportunities.

John P Heap
Chair—Research & Development Committee
Institute of Management Services

Memorandum by Intervid Ltd

I enclose a short statement for the House of Lords Science and Technology Committee enquiry into the Information Superhighway. I would have liked to give a longer statement but only heard about it on 19 January.

The information superhighway is defined as any "publicly accessible network." This includes the Internet and on-line service providers like CompuServe, but excludes private, corporate "Intranets" which use exactly the same technology. It excludes the Academic Networks like Janet and SuperJanet and Dante which are publicly owned but not yet publicly accessible. Both the Intranets and the Academic networks could easily become publicly accessible, and should be encouraged to do so, at least during their non-peak times.

In the United Kingdom interest in the Internet is still mounting, but growth is being retarded by the high costs of local phone calls and ISDN installation charges compared to the US.

Nevertheless the UK is still in pole position to become the Internet production centre of Europe. That is why the two biggest independent Internet Service Providers were taken over by US Internet providers last year.

I recently co-wrote a report on the Internet together with David Tabizel of Durlacher Stockbrokers, and in answer to questions (1.i) and (1.ii) I quote from our executive summary:

- The 190 page document is the first wide-ranging European orientated market survey of the Internet, and is likely to become a benchmark for subsequent studies.
- The report forecasts strong UK growth from the Internet, because the global network is still largely an English-speaking medium, and the UK has the necessary skills and "info-structure" to benefit.
- The UK market will grow from a current value of £35 million to more than £900 million by the turn of the century. Current growth rates are more than 200 per cent per annum.
- The research covered both the Internet user market and the provision of access, hardware and software services.
- It discusses the importance of the Internet to the telcos and cable providers.
- It examines the implications for content providers, such as the on-line retailing, financial services, newspaper and magazine, book publishing, travel and video and computer games industries.

The Report's key findings are:

By early 1996, 33.4 million users will be connected to the Internet.

Commercial subscriptions are growing in excess of 100 per cent per year.

By 2002 more than 200 million people world wide are expected to be connected to at least part of the Internet, with 150 million subscriptions to on-line services.

The World Wide Web is doubling in size every three months. Approaching 100,000 Web sites are forecast by early 1996.

Less than 300,000 UK PC owners currently subscribe to either a Bulletin Board Service or have an account with an Internet Service provider. This represents a penetration of about 3 per cent PC owners today or less than 2 per cent of 1988 forecast ownership.

The US stock markets are currently valuing corporate service providers at an average of 26–28 times annual revenue, and dial-up services at 10–12 times revenues. This translates to approximately £1,500 per dial up subscriber or more than £161,000 per corporate leased line customer.

Retail sales via the Internet are still very low, but are forecast to increase exponentially with the likely arrival of commonly-accepted security standards during 1996.

Twenty-three per cent of respondents to the Report's survey had bought something via the Internet. Over 50 per cent would buy something if security was improved.

The first wave of successful (ie profitable) Internet related businesses will come from the following sectors: Internet access service provision, Internet software applications provision, Internet consultancy (including security) and related hardware provision (services, modems etc).

The second wave will be dominated by content provision.

There will be increased price competition in the ISP market as new entrants aim for market share. Most ISPs will not become profitable until 1997–98 when the overall market will be large enough to support a number of major players on fairly slim margins.

The most popular content on the Internet is still sex, and the biggest user group is the 25–34 year-old middle class male.

The next most popular subjects on the Internet include research, travel, and regional content. Business to business content is growing rapidly. Everything from multi-million pound computers to miles of oil pipeline, to small magazine subscriptions, are now being bought, sold and bartered via the net.

BT and Microsoft will eventually share at least 25 per cent of the UK Internet market. Established providers will however still maintain a substantial market share as long as they provide a good standard of connectivity.

The Internet will soon be capable of international calls at local prices (from a computer direct to a phone, rather than to another computer).

It is issues such as these that are causing telcos to finally start taking the Internet seriously.

Downward price pressure on telcos may mean that within the next few years they will find it harder and harder to charge for time; there will then be a move towards charging for access and content.

The greatest change to the supply of Internet services may come from the arrival of wireless transmission.

end quote.

5.III—PROMOTING AND SAFEGUARDING UK FIRMS WORLDWIDE

Domain naming

Names are the terrain of Cyberspace. British brands are not favoured by the current naming regime. The way that names are granted on the Internet is not transparent, and this is an important issue to brands everywhere.

Each country in the world has the right to issue Internet "domain names". These are unique strings of letters that form an address in Cyberspace. Each country has a different set of regulations. Intervid Ltd has the domain name "intervid. co. uk," showing it to be a UK company. But we also own the domain name "intervid.com." which is a more popular address on the Internet, because it is easier to type in. Virgin Atlantic uses the Internet address "virgin.com".

This reflects two differences between US and UK naming.

1. The US is the only country in the world which does not have to put its country initials on each of its Internet addresses. Thus it has the inbuilt advantage of short internet addresses.
2. The UK is very conservative in its policy, to be granted a co.uk name the applicant must prove some title to the name, preferably a company of the same name. But there have been so many exceptions made to that rule, that there is now a sort of controlled anarchy. The control is exercised by a small committee of Internet professionals who usually meet only by e-mail.

In the US anyone can apply for any domain name. As a result university students who realised this two years ago, now own the names of some of our biggest companies. There are several well-known examples.

5.VI & 5.VII

The US position on export of cryptosystems is in my opinion a severe restraint of trade. The US are still holding to a policy of refusing export licenses to medium-strength software that would allow secure payments and a consequent boom in Internet trading. Much Internet trading at the moment is taking place in America. Much non-US Internet trade has to go via the US because they have the payment mechanisms.

The UK government needs to either provide an equivalent acceptable standard or put pressure on the US government to open up the export of their 128 bit software. The restrictions were first justified during the cold war.

Letter from the Joint Information Systems Committee

The Joint Information Systems Committee funds a network linking all higher education institutions in the UK known as JANET (Joint Academic Network) and leading edge network known as SuperJANET which connects over 130 HEIs. JANET is predominantly a 2Mbps, or less, service while SuperJANET offers bandwidth of between 8Mbps to 155Mbps. These networks are used for teaching and research and include over 100 other sites such as further education colleges, schools and industry. JANET and SuperJANET both form part of the Internet and, therefore, contribute an important element of the information superhighway. They are managed, on behalf of the JISC, by UKERNA (UK Education and Research Network Association) a not for profit company, limited by guarantee.

The JISC also fund a wide range of educational data services and development projects which exploit the network for the benefit of the HE community.

The majority of your questions can be better answered by others but I would like to comment on the following:

2.(iv) The enclosed paper "Exploiting Information Systems in Higher Education" was published by the JISC in April 1995 and addresses a wide range of issues of relevance to HE over the next five to 10 years.

3. HEIs are already providing many services over the Internet from WWW pages to complete teaching modules. The scope is enormous and will involve partnership between universities, schools and colleges providing the academic material and industry providing the technical know-how and marketing expertise.

6. The Scottish Higher Education Funding Council, the Higher Education Funding Council for Wales and the JISC have promoted the development of Metropolitan Area Networks in Glasgow, Edinburgh, Aberdeen, Dundee, South Wales, Manchester, Bristol and London. MANs will provide a particularly fruitful infrastructure for regional collaboration between education and industry.

I enclose a copy of the Education Report prepared for the DTI multi-media Committee and a newsletter on the current activities of the JISC. I hope the Committee finds these of use. The Committee may also find the enclosed letter I recently sent to Ms Margaret Beckett MP, concerning the BT offer to connect up schools and hospitals, of interest.

The disappointing higher education PES settlement for 1996–97 requires the JISC to undertake a fundamental review of its existing and planned activities. This is particularly urgent and means I am unable to respond more fully to your questions by the very short deadline you request. However, I would be happy to provide oral evidence at a later stage.

Professor J Arbuthnott
Chairman

17 January 1996

Letter from the Law Society

I suspect that while we have a very active interest in this subject, we would not feel sufficiently better-informed than many others to offer a worthwhile contribution, in the way of written evidence to the enquiry.

I can say, however, that we have identified that the future of the profession does depend on practices becoming more prepared to take on these developments and we are exploring various ways of ensuring that as a matter of routine, we communicate with our own members through what has become known as the information superhighway. For example, we know that by putting information on the Internet, which is widely used in universities, students receive information where it is less certain that the written materials which we send to them will be seen by them. The businesses which solicitors serve, as well as many private individuals making use of this technology, and therefore the profession, will be diminished if it does not grasp the same opportunities. We have a quite extensive study being undertaken on this subject, and we are working closely with the Law Society of Scotland, but as I say at this stage, I doubt whether there is much that we can submit by way of evidence.

J W Hayes
Secretary-General

19 January 1996

Memorandum by the Library and Information Commission

The Library and Information Commission was established in 1995 as a national focus of expertise in the field of library and information services. Its function is to advise Government on library and information issues, speaking to the Government with a single voice, to maximise benefits from available resources, especially by avoiding wasteful duplication of effort, and to encourage co-operation and co-ordination across all sectors for the benefit of all users.

Particularly in view of its remit to advise Government and because information technology and networking have already been identified by the Commission as priority areas for action, the Commission is pleased to have the opportunity to submit evidence to the House of Lords enquiry.

The enquiry will no doubt already be aware of the Parliamentary Office of Science and Technology's report on Information Superhighways—the UK National Information Infrastructure (May 1995) which comments on many of the questions listed in the Call for Evidence.

1. *What is the current form of the Information Superhighway?*

The Information Superhighway is often confused with the Internet, but the former is a much wider concept, dependent on widespread availability of broad bandwidth for the transmission of multimedia. The Internet, consisting of a large number of linked computer networks, is used for electronic mail, and rapid information retrieval, transfer and delivery. In addition, a vast range of organisations are making available information about their products and/or services, enabling commercial transactions to be conducted over the network. It is increasingly the case in all sectors that organisations without their own well-designed Web site could be regarded as poor relations.

Because this kind of information networking is becoming a crucial element of the Information Society, organisations and individuals without access will risk being left behind. For this reason such organisations, besides funders and policymakers, have a major interest in bringing the "have-nots" up to speed.

Use of the Internet in commerce and industry is growing, though security concerns are still preventing many companies from fully exploiting the network.

How is the Superhighway developing in the United Kingdom?

Development in the UK is piecemeal; many academic institutions, government departments and quangos, including their libraries are connected but not, as yet, public libraries, homes, hospitals and schools on a comprehensive scale. Besides lack of bandwidth, lack of funding is one of the main obstacles. The Labour Party leader, Tony Blair, attracted attention in the latter part of 1995 by announcing a deal with British Telecom (currently prevented from delivering entertainment in order to protect the cable industry), which would, in return for the lifting of these restrictions ahead of time, connect schools, hospitals and public libraries. However, doubt has since been cast on this proposal, making it even more important that the issues should be addressed by the Government now.

The UK's Joint Academic Network (JANET), developing into SuperJanet, is a world leader, and steps should be taken to ensure that it stays a world leader. However, it is available only to academic institutions, research councils and The British Library. Although some other organisations, for example some schools, are connected they must pay for this privilege.

Various organisations are involved in providing Internet access, especially the more lucrative training, to the public. Operating on a commercial basis are the Internet access companies, eg Pipex, the cybercafes, and the Input/Output Centres which are sited in a growing number of public libraries.

The British Library Research and Development Department is funding two projects (IT Point at Chelmsley Wood Library—Solihull MBC, and CLIP—Croydon Libraries Internet Project) which are exploring ways in which public libraries can exploit the Internet, either as a staff resource (eg for dealing with reference enquiries in the case of Croydon) or for wider public use (IT Point).

The UK Office for Library and Information Networking (UKOLN) is jointly funded by BLRDD and the Joint Information Systems Committee of UK higher education funding councils. Its main interests are the use of networks by the library and information community and the management of bibliographic data. It plays a major role by carrying out research, organising seminars and conferences and generally raising awareness of networking issues.

ICL and its parent company, Fujitsu, are committed to positioning ICL in the multimedia market. As part of this strategy, ICL is associated with the Cyberskills project in South Bristol, an extremely deprived area. The project is intended to empower local people, many of whom are unemployed, in the use of IT, including the Internet, and so far 5,000 people have been trained. The project has been very successful, and a total of 10 centres throughout the UK are expected to be operational by March. An additional incentive for such training lies in the huge potential for lifelong learning, much of which is self-directed and carried out at a distance. (1996 is the European Year of Lifelong Learning). Lifelong learning also has major implications for public libraries, many of which are still without Internet access.

The issue of public library access to the Internet was highlighted in the Aslib *Public Library Review*, commissioned by the Department of National Heritage in 1994. The Review had identified the public library as the institution with which the public felt most sympathy, making it one of the most promising places to site Internet access, obtaining a 100 per cent response rate from the 167 UK public authorities. It was found that only a very small number of authorities had full Internet access for users as well as staff. This is a situation which must be remedied in order that public libraries and their users are able to take advantage of the benefits offered by the Internet. To this end the Library Association, the professional body for librarians in the UK, which had already produced a Policy Statement of Information Superhighways, is submitting a bid to the Millennium Commission. If successful this would provide 50 per cent of their necessary funding for the networking of public libraries. (The initial application has cleared the first hurdle and the final bid is due for submission in February).

The Economic and Social Research Council, under its new Media Economics and Media Culture Research Programme, is funding a £161,340 study (October 1995-September 1997) on the potential social consequences of the Information Superhighway. The study will focus on the question of what regulatory framework and what institutional arrangements will encourage a universal service and open access, also examining how such access could affect beliefs and perceptions in society. It will also look at the conditions which information providers need to meet to ensure that key information is accurate, complete and up to date.

A matter of some concern for the UK is that initiatives are emerging from two different directions—the library side and the cable/community networks side. Although there are some joint library/community initiatives (for example in the London Borough of Newham) these are comparatively rare. In most cases initiatives are developing separately, are underresourced and lack a national focus. This situation does not represent the best use of resources.

How is the Superhighway developing worldwide?

The United States is generally considered the world leader, the main spokesman being Vice-President Al Gore. The United States National Information Infrastructure aims to promote private sector investment, through appropriate tax and regulatory policies, and to extend the universal service concept to ensure that information resources are available to all at affordable prices. Political commitment to the Superhighway ideal is exemplified by the fact that it is possible to contact many US politicians by e-mail.

The European Commission had already produced several major policy documents on this theme, including the White Paper on Growth, Competitiveness and Employment (December 1993) and the report of the High Level Group on the Information Society—Bangemann Report (May 1994). The Commission then hosted the G7 (Group of Seven leading industrial nations) Ministerial Conference on the Information Society, in Brussels, in February 1995. Europe, Japan, the US and Canada had separately begun to lay the foundations of their information societies and the intention of this conference was to ensure that all were working according to the same design for a worldwide Information Society, rather than pursuing their own paths. Several principles were seen as crucial, including: access for all, offering choices for all cultures and languages; private sector infrastructure investment within a fair competitive environment; compatibility of standards; guaranteed privacy and data security; protection of intellectual property rights; international co-operation in research and development. Also recognised were the need for greater public awareness, attention being paid especially to small and medium sized enterprises and public administrations, and for consistency in legislation regarding media ownership.

In 1994 the International Federation for Information and Documentation (FID) established a special Task Force on Global Information Infrastructures and Information Superhighways. Its intention was to help shape the content and direction of emerging national and international efforts to establish globally interconnected telecommunication networks giving access to worldwide information resources. FID believes that non-governmental organisations (NGOs) at all levels have a key role to play in the planning, design, development, monitoring and evaluation of global and national superhighway visions, because they can help to balance the competing political and economic interests of the private sector on one hand, and national governments on the other. To this end, FID initiated a strategic alliance to address all these issues, and the Tokyo Resolution (now called Global Information Alliance) was signed by over 40 NGOs in November 1994.

As a small nation state, Singapore has set an enviable example with its "intelligent island" strategy. In March 1994 Singapore's Ministry of Information and the Arts produced *Library 2000: investing in a learning nation,* a report of the Library 2000 Review Committee. The Committee was set up in 1992 to undertake a comprehensive review of library services in Singapore and recommend how libraries could serve their users better in the future. The Review and Report is part of an advanced national infrastructure (NII) being developed under the IT2000 plan, expected to provide a new generation of information superhighways to distribute information and knowledge, empowering individuals to perform optimally in their "learning nation".

What specific problems arise from incompatible network standards?

Regarding standards, incompatibility could be caused by attempts within Europe to promote European products and standards, whereas *de facto* American products and the standards are more commonly accepted. Also, the entertainment industry is taking the lead and will therefore set standards which others will have to follow. Meanwhile, TCP/IP (Transmission Control Protocol/Internet Protocol) is the preferred communications protocol.

A related issue is that of Superhighway access via cable. Within the UK, it is not feasible to cable large rural areas, with the result that by the end of the century, 25 per cent of homes in the UK will remain inaccessible by cable. In some quarters it is felt that cable access should be developed wherever possible, especially in the urban areas, rather than allowing the lack of cable provision in rural areas to retard developments in the UK as a whole. However, such development would depend on the willingness of cable operators, who currently tend to be more interested in delivering entertainment than community services.

2. *What services are being provided and should be developed?*

A large number of organisations have made information available on the Internet in all the categories listed, and demand is likely to rise as Internet access accelerates. There will be greater need for more Government information (see 5). There is great potential for the delivery of public information for local communities, of entertainment and of information on education and training, including the provision of educational material for distance learners (see 4).

The Superhighway is expected to provide easier access to the wealth of information already available in electronic form, for example the "traditional" databases. It has the power to revolutionise all aspects of trading, consultation, information provision and access, but the UK needs to plan strategically for this and how to take advantage of it. The UK failed to become a major database producer or online vendor in the 1970s and 1980s, but the Superhighway now presents a tremendous opportunity for the UK to become a powerful information provider. The UK is also in a strong position to develop access technologies and software.

An area which needs much more development is that indexing Internet resources, a task to which library and information professionals are ideally suited. Some work is already underway within the Joint Information System Committee's Electronic Libraries Programme. A major focus within this Programme, known as ELib, is electronic document delivery, which will be an increasingly important role of the modern library.

3. *Who will supply these services to consumers in the United Kingdom?*

Information provision is anarchic at present and much of it will remain so. Although it is difficult to predict the supply structure, it is likely that many suppliers will be small and some will supply information free of charge. Service standards are developing for ordering and payment but much more needs to be done in this area. "Traditional" publishers are likely to feature amongst suppliers since many are now developing electronic document delivery services.

4. *Providing universal access*

Professional librarians and information managers act as skilled intermediaries between the resources proffered by the Superhighway and their users. Information professionals are not only experienced navigators of the vast range of information resources but also researchers and analysts, capable of packaging and repackaging information, tailoring it to the needs of the end user. However, their skills and crucial role in the information chain have not always been recognised by Government and industry.

In July 1995 the Commission responded to a DTI consultation document on the forthcoming European Commission programme INFO 2000, aimed at stimulating the development of a European multimedia content industry and at encouraging the use of multimedia content in the emerging Information Society. It seemed that not many information professionals had been invited to the consultation meeting, and those present observed that the programme seemed to be too industry driven, paying insufficient attention to the needs of users. The role of library and information professionals was barely mentioned, yet the latter are in a good position to address at least two of the four Action Lines (AL1: Stimulating demand and raising awareness, and AL4: Support Actions). There is a tendency in documents of this type to propose the invention of another kind of information supplier, whereas for many years the proposed functions have been carried out by information professionals, who are well placed to provide the training and guidance which many users will need.

Adequately resourced, public libraries would have the ability to become important hubs on the new information networks, taking advantage of fibre optic links installed by cable operators to transmit large quantities of local information of value to families and businesses, and acting as community resource centres.

The Superhighway could reinforce a public service role in four key areas of government policy:

(a) Public access to information
(b) Access to lifelong education, training and information on employment opportunities
(c) Access to the nation's heritage via digitisation of museum collections, etc.
(d) Assistance to SMEs, increasing their competitiveness

Public access to information is important because the cost of domestic Superhighway access is high and beyond the means of lower income groups. Access could be provided in branch libraries as well as central public libraries, putting the Superhighway within reach of a large proportion of the population.

The networked public library is in a good position to contribute to these developments, occupying a key position within the community, Besides serving the needs of the public and of businesses, the availability of sufficient bandwidth could enable the effective and timely delivery of educational material and multimedia products (eg digitised museum collections).

5. *The role of central government*

The Parliamentary Office of Science and Technology's report on Information Superhighway—the UK National Information Infrastructure recognises the need for a central vision and makes suggestions for Government action regarding education, healthcare, defence etc.

It would be helpful if the Government could take a more structured and coordinated approach to the superhighway developments, which are increasingly recognised as crucial. Rather than leaving these developments to market forces, there needs to be a major information campaign directed at the public, industry and commerce, to raise awareness of the Superhighway.

At present JANET and SuperJANET cannot normally be used by non-academic bodies, but an increasing number of information services are being licensed to run on these networks which are of interest beyond academia. The public library would be the ideal place to make such services available to all types of users, and it would be helpful if the Government could facilitate such a development.

Besides providing much needed funding for the networking of public institutions such as schools, libraries and hospitals, the Government's role is to facilitate any necessary legislation and keep abreast of and contribute to European developments. One of these is the continuing deregulation and stimulation of competition in the telecommunications industry. (The far greater cost of telecommunications in Europe, compared with the US, is acting as a brake on the development of the Superhighway).

Another brake is the relative lack of computers in schools and public libraries. A mixture of public and private sector funding could be used for purchasing the necessary hardware and software, since it is crucial to take steps now which will ensure the computer literacy of future generations.

Through the DTI the Government could perhaps do more to assist SMEs to exploit these developments, thus enhancing their competitiveness. The Superhighway has great potential for the delivery of advice and information to SMEs, through remote access to the public library for example (see 4d). The DTI's Business Link initiative was set up to provide information and advice to SMEs, and promotion of the Superhighway to SMEs should be part of the former's role. However, there is some evidence to suggest that the Business Links have proved less effective than they might, and that closer involvement of already existing library and information services can be beneficial.

Another important role is in promoting open government. This relates not only to the desire for free availability on Internet of important information, for example *Hansard* and UK census data, but also to the variations in Government department policy. Whereas some departments have impressive Web pages, with links to other information sources, others have no Web page and are not even connected to e-mail.

An issue not identified in (i) to (ix) is copyright. This has assumed even greater importance in the electronic environment and UK legislation, the 1988 Copyright Designs and Patents Act now proving inadequate. A number of European funded projects are looking at copyright issues as part of their work, and a very large project, with several major players (Imprimateur) is examining the issue as a matter of urgency. Because any new legislation will emanate from the EU, the Government could usefully represent the needs of users and information professionals, since at present the law is weighted in favour of the information providers, who are reluctant to permit "fair dealing" in the digital environment.

6. *What is the role of local and regional government?*

There is increasing interest in government at regional level and the regional provision of services. This is reflected within the library and information profession, partly as a response to the Aslib *Public Library Review,* several meetings and conferences on this topic having taken place recently. More and more metropolitan areas are seeing formal cooperation arrangements developing between publicly funded libraries (public, university and college libraries) and such cross-sectoral arrangements could be a useful platform for promoting the Information Superhighway in the area. Reinforcing the public library's existing role in lifelong learning and in promoting public access to the Superhighway could significantly boost local employment opportunities, which in turn could contribute to urban regeneration. The local employment market could also benefit considerably from use of the Internet to disseminate information speedily about funding and training opportunities.

7. *What will be the impact of the Superhighway on working practices and employment prospects?*

One effect of the Superhighway on working practices and employment practices would be to reduce the need for many office-based workers, at the same time increasing the market for teleworkers. Teleworking has advantages for both employers and employees, in terms of flexibility, avoidance of wasteful travelling time, etc but also has disadvantages, for example, equipment costs and lack of social contact. The increase in teleworking is likely to boost local economies, encouraging individuals to use local facilities, an option not open to conventional commuters. There is, however, a feeling in some quarters that teleworking is being promoted by the telecommunications and IT industries, which stand to benefit from equipment sales, but the economic benefits have not yet been proved.

8. *US domination of the software market*

Although US Japanese dominance in hardware and software are likely to continue there are opportunities for the UK in software development, and pump priming funds could be given to appropriate developers. It has been noted that information content is what Europe, and the UK in particular, excels at and efforts could be concentrated in this area. The Commission feels that the concept of UK oriented software is irrelevant in an international electronic world.

CONCLUSIONS

In conclusion, the Library and Information Commission sees the following issues as the most pressing: further deregulation of the telecommunications industry; wider availability of computers in schools and public libraries; the networking of public libraries as important nodes delivering, *inter alia,* local community information and education material; promotion of the potential of the Superhighway to SMEs; substantial extension of the range of Government information made available free of charge, and recognition and promotion of the crucial role of information professionals in the development of the Information Superhighway.

The Library and Information Commission appreciates being given the opportunity of contributing its evidence to this enquiry, and would be pleased to give oral evidence, if required, and be informed of its outcome.

February 1996

Memorandum by the Library Association

INFORMATION SUPERHIGHWAYS

Library and Information Services and the Internet

1. INTRODUCTION

The term "Information Superhighways" has vastly increased in currency in the last 12 months. Like many such terms, it may have been used by politicians and the media to mean whatever they want it to mean, but there is no doubt that its currency in the language presages a major development in access to information and resources. The first significant step on the way to the realisation of Information Superhighways is the increasing use, for many different purposes, of the Internet.

The Internet consists of a large number of linked computer networks forming a global network. This is largely open and free, allowing users to communicate with each other for work and recreational purposes, and for corporate and personal reasons. Because the Internet is so vast and is without regulation or hierarchy, the network is a treasure trove of information from many sources. Resources are available in all subjects; mailing is possible for all the participants; documents can be forwarded and delivered across the world, and directories and journals abound. Developments such as the World Wide Web combine friendliness of user interface with enormously powerful information retrieval capability. Electronic mail is one of the most important services offered through the Internet, with each person having a personal mail address, enabling them to link up to another user anywhere in the world and communicate within seconds.

It is already apparent from the still comparatively limited experience of the Internet (its use in libraries has been almost entirely confined to the academic and research sectors, through JANET, the Joint Academic Network), that information networking offers an enormous potential for change. So much so, and in so many aspects of how information and resources are retrieved and delivered, that makes it of vital interest to the future of the library and information profession, as well to the future of allied sectors, such as the publishing and bookselling industries.

2. LIBRARIES AND THE INTERNET

(a) *Academic Libraries*

Academic libraries have been making use of JANET since its inception as a means of improving access to information and thereby improving the service that they are able to offer to their users. In many institutions it was the library service that was the first department to make regular use of the network. Typically this was to use JANET instead of slower methods of communication as means of accessing remote databases (eg DIALOG). This was followed by the use of electronic mail to transmit Inter Library Loan requests between libraries. From this came even more extensive use of e-mail to allow exchange of professional expertise and good practice usually via the increasing numbers of discussion lists both in the UK and in other countries, notably the USA. At the same time an increasing number of library catalogues became available for anyone with access to JANET to consult without cost. This was often merely an extension of increasing network access to library catalogues on campuses.

In recent years the use of JANET by academic libraries has rapidly increased until it has become something that they cannot do without. Access to JANET means access to the Internet/Information Superhighway and the variety of information sources that are available. As the amount of information continues to expand it is vital that Academic Libraries have access to it in order to support the learning and research work carried out in British Universities.

Increasing numbers of libraries are no longer using JANET and the Internet simply as a means of gaining information, but are also actively establishing information servers to supply information about their own resources. This information no longer need be restricted to simple bibliographic records or listings of holdings of a particular library but can be the full text of an article, including images and sound. In addition there is a growth in the number of databases or databanks (eg the Bath Information and Data Service—BIDS) which having been searched can provide access not only to surrogates of the document required but even to the full text or full image of the document itself. We can expect that not only will use of these services grow but that the information they provide will become more sophisticated. It is the need for access to such material that makes the need for the broadband network SuperJANET so pressing. It is imperative that access is spread as widely as possible to the power of the broadband network, and the growing diversity of information that is available.

The Information Superhighway offers an opportunity for British academic libraries to help keep their institutions at the forefront of research both by providing the necessary information when required, and by giving guidance to researchers on what is available for them to investigate. In addition, it is increasingly being used imaginatively as a medium for teaching and learning. There is a growing need, however, for access to the network to be extended beyond the higher education sector, especially as courses are increasingly being franchised in colleges of further education.

(b) *National Libraries*

The national libraries, which have access to JANET, are making increasing use of the network to deliver and promote their services. The National Library of Scotland, for example, is making available unique databases such as the Bibliography of Scotland.

The British Library launched its National OPAC (NOPAC) over JANET in 1994; at present, this is free of charge. The NOPAC, which is a modification of the on-line catalogue which will be available at the St Pancras building, gives remote access to the catalogues of the collections of the humanities and science reading rooms in London. Access is also possible to a number of individual catalogues of collections held at the British Library.

As part of the British Library's Initiatives for Access, the NOPAC is one of the projects being developed to further the strategic objectives for the year 2000. Other aspects of the Initiatives project include Portico—the "electronic shop window"—which is designed to provide a wide range of information about the Library's products and services.

(c) *Public Libraries*

Public libraries have not had the same opportunities or funding for access to the Internet, as have been available in the academic sector. This has adversely affected public library access to information in two ways. First, public libraries have not been encouraged to experiment with the information networks, to find out how they might be used to improve information services to the public, and consequently to justify funding its provision. Secondly, they have not been able to identify funding, partly because of inability to experiment, partly because of government restrictions on local authority spending and reductions in government grants.

There is some sporadic public library connection to the network: Croydon Library Service has British Library Research & Development funding to test networked access to the Internet, and some individual librarians and library authorities subscribe to commercial Internet services eg Demon. In conjunction with the Library Association, ten libraries (the maximum) have accepted the BBC's offer of three months free access to its Internet service, Auntie. Another group of library authorities, together with LASER, have launched Project EARL, to explore public library uses of networking.

Public libraries play a unique role in bringing information to the general public, bridging the gap between the "information rich" and the otherwise "information poor". This role becomes more important if, as seems likely, the gap widens between the "rich" with access to academic or commercial superhighway information services, and the "poor" without access to information which may increasingly be limited to the superhighway.

The Association views, therefore, with some alarm public libraries' incipient information poverty relative to academic libraries and to information rich organisations and individuals. It recommends that national government and local government should take steps to place public libraries firmly on the broadband information superhighway.

Given access to the network, public libraries should:

- use their skills to identify information, whether in text, image or sound, and route it as appropriate to people in need of it;
- provide network access points, free or charged, as appropriate;
- provide opportunities for education and training in the use of the network;
- use open information systems and broadband communications to integrate use of the network with mainstream library services;
- publish appropriate information, eg catalogues, community information, archives, over the network;
- apply their skills to the management of the vast amounts of information on the network;
- as appropriate and in partnership with the academic sector, provide information from the network to students and distance learners.

(d) *Special Libraries*

Information networking has much potential for the libraries of commercial and industrial companies, and for those in professional and research bodies. These organisations possess considerable specialist expertise, and their libraries perform a significant role in identifying and obtaining the information which they need.

To conduct information research on products and markets, they access a wide variety of sources, increasingly in electronic form. They disseminate information to staff or users within the organisation, perhaps on multiple sites, travelling outside the office, or working from home. Alternatively a membership or subscribers may be supplied with material. The traffic is often international. A standard system is required to obtain information from the range of sources, and pass it on to all who need it.

Special libraries operate within the prevailing technology of their organisations. This is often different from that required for exchanging information with other bodies. In general there is no one system which gives straightforward access to the material the libraries require. Examples of some of the specialised systems available are as follows. Some of these operations could be transferred to a superhighway, if adequate controls are in place, and the consequent standardisation should increase usage.

- Closed user groups or specialised networks allow organisations with related interests to exchange information and documents. This may be in electronic form, or sometimes just in hard copy. As group membership is limited, some information requirements are not met by these means.
- Organisations which use electronic data interchange (EDI) and other transaction data transmission systems can use these in some cases to access other types of information.
- Companies exchange messages with customers and suppliers, business contacts and related bodies. Integrated systems may be established for key contacts, though it is rarely possible for an organisation to match all the different types of technology required.

Businesses and other commercial organisations would value a speedy method of accessing the output of academic and research organisations. Such improved links with outside bodies will create channels for providing funding and finding practical application for research.

Companies and professional bodies could bring economic growth as a result of increased business and international trade, through using a superhighway to collect information and to publicise their own activities to potential clients.

Prime requirements are as follows:

- Speed of exchange of data. Most commercial organisations need to be able to research topics to obtain the relevant information to very short deadlines.
- Value of information. Value is more important than for the information to be free. A mechanism for payment, subject to security controls, is necessary.
- Confidentiality, for competitive reasons, or in order to protect the interests of the organisation and its clients or correspondents. This situation differs from that in the academic community, which aims to publicise its information widely.

3. INTELLECTUAL PROPERTY AND COPYRIGHT

As will be apparent from the previous sections, the development of a global information infrastructure brings with it unprecedented opportunities not only for providing information, education and entertainment but also for improving trade and business links. However there is a danger that the potential will not be fully realised until mechanisms are incorporated into the network, for the protection of intellectual property. Without adequate controls, intellectual property can be exploited around the global network regardless of copyright legislations. One result of this is that some rights owners are not allowing their works to be digitised and transmitted electronically, because of the fear that their rights will be abused. Inevitably this is having an effect on library and information services to all sectors. In order to ensure that such an effect is minimised, the problem of copyright will have to be addressed. There is no provision in UK copyright law which gives librarians or their users any rights to deliver information in electronic form. A contractual arrangement, or *ad hoc* permissions, is currently necessary because of the fear of loss of control by rights owners. If permission is not given, traditional methods of delivery still have to be used. Copyright is therefore seen by librarians as a barrier to full network use.

It is vitally important that the information contained in copyright works is available to all. Librarians, as an important link in the information chain, are in a position to control information flow on the networks and therefore to protect copyright works from abuse and exploitation. It follows therefore that librarians, at least in the non-profit making sectors, should be seeking rights to use electronic information in the same way as its printed equivalent. This will require the international harmonisation of intellectual property legislation, to include an equivalent of the fair dealing provisions covering printed materials, as well as some standards for the provision of licences to use information in electronic form.

4. The Role of the Library Association

The Library Association is the professional body representing more than 25,000 members, including institutional members and personal members working in library and information services of all kinds. Under the terms of our Royal Charter, granted in 1898 and revised in 1987, we have a duty to promote and encourage the maintenance of adequate and appropriate provision of library and information services.

The Library Association is committed to the principle that the benefits of new technologies should be harnessed and exploited for the better delivery of services to users. The Association is also committed to the promotion of the unique role of library and information workers—with their skills in organisation, evaluation, assessment, selection and packaging of information—in delivering these benefits. It is the library or information service in an organisation—whether this is an educational institution, a commercial or industrial company, a professional body, a local authority, or whatever—that is in the best position to exploit the capacity of the network to deliver information and resources to users. Library and information workers—the members of the Library Association—are the trained and experienced experts in the organisation and delivery of information. This applies equally to the traditional media and to the new media.

The Association would also reiterate the role of libraries in breaking down the divisions between the information rich and the information poor, and welcomes the opportunities offered by the information networks to improve the freedom of information and to increase the openness of government.

The Library Association is committed to a programme of activity which aims to increase the ability of users to access and exploit the benefits of information superhighways, through libraries and information services.

In addition, the Association is committed to exploiting the power and flexibility offered by the network for the delivery of its own services to members, and others as appropriate.

5. Summary of conclusions and recommendations

The Library Association recognises the potentially vast and profound impact of information networking on the delivery of library and information services, and advocates the unique role of our members in exploiting that potential for the benefit of users of all kinds.

We consider that it is essential that all possible steps are taken to ensure the widest possible access to information networking in library and information services of all kinds.

The Library Association, therefore will:

— undertake a programme of professional development for members, including publications and events, aimed at ensuring that they are fully aware of and understand the potential of information networking, and are able to take advantage of it;

— lobby government and other relevant bodies to provide the necessary infrastructure to enable libraries of all kinds to offer access to networked information to their users;

— lobby government to ensure that the power of information networks is exploited to promote freedom of information and open government;

— work with networking practitioners to develop good information management practices, covering matters such as quality of information, accuracy and confidentiality;

— seek wider access for academic libraries, as appropriate, to SuperJANET;

— seek the development of appropriate payment mechanisms for networked information, so that the value may be recognised, and owners of intellectual property rewarded appropriately;

— lobby government and other relevant bodies to seek necessary changes to legislation, so that:

(i) international intellectual property laws are harmonised to accommodate the protection of works of the mind in digital form to enable an unrestricted flow of information.

(ii) licences are available to enable librarians and information workers to copy, fairly, copyright works electronically for document delivery to users.

(iii) an arrangement equivalent to the fair dealing provisions covering printed materials should be available to librarians to enable them to facilitate the flow of electronic information.

The Library Association

January 1995

Memorandum by Ofsted

Formal and informal education are amongst the most significant areas of application for Information Superhighways. In offering the comments which follow, Ofsted is reporting relevant evidence from inspections of schools and teacher education institutions, rather than offering radical new visions of the potential benefits to education of Information Superhighways. An attempt is made to reflect on the ability of educational institutions in general to respond to the challenges which these new technologies offer, and to some of the potential benefits.

SYNOPSIS

Like computer education in 'eighties and early 'nineties, Superhighways are likely to have an impact in schools only after considerable investment in infrastructure and support. England has some solid experience in schools of the use of narrow band telecomms. But such applications have been hampered by technical problems and the need for schools to be prudent, and to control their spending on telephone links for curricular purposes. If Superhighways are to have an impact on the life and ethos of schools, on the content and delivery of curricula, on learning processes and on the professional functions of staff, then all the relevant technologies need to be affordable to instal and use, and reliable.

Ofsted's evidence from schools points to institutional and individual needs which could be addressed by newly developing broadband services and applications. The roles of central and local government would be critical in establishing a measure of quality control and of support for networks of educational users in institutions and homes. One particular application, linking working adults to pupils in inner-city schools, could provide a paradigm with benign societal effects.

Question 1: What is the current form of the "Information Superhighway" and how is it developing (i) in the UK and (ii) worldwide? What specific problems arise from incompatible network standards and why are these incompatibilities arising?

1.1 The technology of Information Superhighways, as defined in the Committee's rubric for this enquiry, holds much promise, but has hardly impacted on English schools yet. Cable and other high-speed lines do pass in the vicinity of many schools. But the physical connection of school premises to the Superhghways and the development of a LAN network within a site to allow access from various rooms, have been implemented in only very few institutions. Where such Superhighway connection has been effected, interested teachers have begun to access high-quality stored materials, or to communicate with other institutions, but usage has often been limited. This is partly because of the dearth of material with curriculum relevance on fileservers, and partly because physical connection has rarely been smooth and productive in the use of teachers' and pupils' time.

1.2 There is much experience of ISDN and slow-speed, dial-up links between institutions, eg between a group of schools in Wales and a centre which receives satellite images from Meteosat. These real-time images are available to the schools via ISDN and are used in the teaching of geography.

1.3 Satellite pictures and much other scientific data are also available via the Internet to pupils of all ages in other schools. Usually access is through PSTN lines, which are too slow for transmission of graphic images during lessons. Where such lines are used it is mainly for searching text-based materials and for email. There is a growing number of schools with ISDN connections.

1.4 Most schools have experienced teething troubles and problems of contention, in the course of connecting to their local providers' fileservers. Some are not much farther along the road to smooth working a year after first access to the Internet. IT enthusiasts in schools have often persevered, and are treating these initial problems—as some of them had done those arising in the early stages of school computing two decades ago—as leading-edge experiences: a preparation for using Superhighways.

1.5 In schools, therefore, the current PSTN or ISDN2 technologies are serving as surrogates for the full broadband Superhighways of tomorrow. The uses to which the technology is put are briefly outlined in Question 2(iv) below.

Question 2: What services are being provided (and should be developed/will be required) within education?

2.1 Virtually all information services provided for schools via Superhighways are in their infancy. Rapid developments are expected in several commercial information and telecomms services which were recently launched in the UK; at least two services, based on broadband technologies, are conducting local trials.

2.2 By comparison, unadorned e-mail services are more commonly used, though they too are in their infancy in terms of convenience of use. E-mail is generally more mature, reliable and educationally productive at present than most other on-line applications. Even with e-mail, there are differences in protocol for access, depending on the platform used, and there are few up-to-date on-line directories which facilitate access to useful contacts for pupils and teachers.

2.3 Using email and access to databases, pupils have communicated internationally, eg in planning holidays by corresponding with agents or partners abroad; they have interrogated remote databases in science, geography and modern foreign languages, or consulted experts on scientific or cultural questions; others have researched or debated environmental topics with unknown peers across the globe who have similar interests; pupils with moderate learning difficulties have taken great care to hone their prose writing so that it is suitable for relevant readerships, eg user groups sharing their football interests (the English variety!). Teachers too have used e-mail and bulletin boards to follow up in-service training courses which they had attended.

2.4 Some of the search engines on the Internet have also been used to good effect by pupils, though system response has often been erratic at different times of the day. As the technologies improve, these narrow-band activities will no doubt be upgraded by enthusiasts to full Superhighway working. A small minority of pupils, with access to the Internet at home, is advantaged over their peers; they readily gain "network literacy" and information skills, and are sometimes able to turn in more up-to-date, informed, homework than fellow pupils.

2.5 Applications which hold out great promise for education are:

(a) remote teaching of pupils and teachers by experts through wide-area CCTV in widely dispersed areas; this could involve remote observation and supervision a practical activity and discussion of its outcomes; it would also overcome problems of pupils who are hospitalised or otherwise isolated;

(b) virtually unlimited access to well-indexed and researched audio-visual resources for studying specific subjects, or for experiencing rare, expensive or dangerous contexts;

(c) access, through effective and speedy search engines, not merely relevant articles of interest to a learner or problem-solver at home, but to facilities that will select and precis such relevant material in a form suitable for a particular user;

(d) extension of e-mail and bulletin board communications to encompass face-to-face electronic contact between students, particularly able and interested young people who need to work with their peers on shared, stimulating tasks;

(e) use of interactive technologies in initial teacher education, eg for students and remote tutors to share classroom observations and to address new issues in real time;

(f) a likely growth in communications between schools and homes even beyond school hours, eg to allow periods of "supervised homework", when both pupil and parent may be in active contact with the teacher on duty in the virtual "homework room"; a consequent growth of regular home-school liaison concerning consistent expectations of pupils;

(g) the provision of packages for teaching specific basic skills of numeracy, communications, self presentation and other vocationally useful skills, for students at home and at work; payment for such on-line training or revision might be contingent on the student achieving identified and agreed results or specific vocational goals.

2.6 Superhighways may become victims of their own success in education. The information capacity of Superhighways, is virtually limitless, but variations in speed of response and contention for access and supporting services will probably cause problems for a while. Whatever applications are developed, there will be a need to ensure that those Superhighway functions, materials and services which are educationally useful are not drowned out by poor material or by diversions which have mass appeal.

2.7 It is therefore important that learners and teachers are not put off using Superhighways because of the mismatch between current realities and the hype that usually accompanies discussion of available facilities and their potential. As in the case of computers in primary schools, early failure to use Superhighways successfully could predispose people against using them again in the near future.

2.8 Some issues are listed below of which school and home users of Superhighways need to be aware, when they plan access and infrastructures, and with which schools need help before they can go much farther. The list is not exhaustive:

- that significant differences now exist in the types of Superhighways links available;
- in which broad directions telecommunications technologies are likely to develop; what the implications of these alternatives might be for education;
- that, if more than a single user in an institution is to be connected to the Superhighway at any one time, then a high-speed internal network and a switch to the external node is needed;
- that the capacity of networks within the institution to cope with simultaneous, high-speed traffic from several users needs to be carefully estimated, and that the switch linking a school to the

Superhighway must be configured to have sufficient power and capacity to avoid contention problems;

- some orders of magnitude for the installation and servicing costs of different models of linkage and usage;
- that schools need to train or acquire first-level support staff who can fix simple malfunctions, and recognise those which really require outside help.

Question 4: How can universal access to services provided for the common good be secured within a competitive market framework?

4.1 Such access can be secured by the Regulator imposing a levy on users of existing Superhighways and using these funds differentially to attract a broadband infrastructure of the appropriate kind to remote areas. It is important that inter-operability of systems is assured by regulation, so that connection to any one node of the Superhighway with a connector and switch of given characteristics and power will allow one to communicate securely and conveniently with anyone else on the Superhighway. This is essential if users and those who make financial decisions in schools are to have confidence in these networks and their links with them.

4.2 The levy mechanism might also be used to ensure that educational institutions are offered attractive tariffs for their use of Superhighways. This has already been proposed by OFTEL in the recent discussion paper "Universal Telecommunications Services".

4.3 At present the tariffs for connecting to, and using telecomms networks are a major barrier to their productive use in schools for access to information and to wider learning communities. The current charging algorithms, whereby the user pays according to the time spent on-line, will usually cause financially prudent schools to pause before encouraging pupils to search purposefully in large databases; to retrieve large files or images; and to browse on-line texts for high-quality, relevant information. In almost all the examples cited of large-scale use of telecomms by schools the telephone charges had been either waived or heavily subsidised.

4.4 Whatever the tariff for access, it needs to contain safeguards which allow the costs to be effectively and responsibly controlled by the institution. Schools lose control of expenditure where pupils can incur large charges when they log on to certain networks, and where there is no protection against accidental or unauthorised access to costly or unsavoury material.

Question 5: What is the role of central Government in connection with the "Information Superhighway" service provision, including: (i) leadership & (iv) network compatibility (for educational users)

5.1 In respect of educational uses, central Government needs to:

- procure evaluations of the best educational uses of Superhighways in teaching, and in learning at school, public access points, such as libraries, and in homes;
- disseminate the findings of such evaluations; encourage a culture of sensible use of cost effective, worthwhile facilities, which eschews the superficial;
- encourage networks of professional support for Superhighway users in formal and informal education;
- alert educational users to the real (and often hidden) costs of installation and maintenance of links to Superhighways, reminding them of issues such as those in para 2.8 above;
- promote the training of teachers both initially and in-service in the productive uses of Superhighways and the teaching of "network literacy";
- develop a strategy for assuring the quality of materials which reach Superhighways through broadcasting channels;
- agree international principles and laws on copyright in the light of Superhighways;
- ensure that these laws are respected on every fileserver registered in the country;
- ensure that OFTEL has the powers necessary to secure the connection of all maintained and independent schools to Superhighways of the highest quality, reliability, compatibility and inter-operability, adhering to an agreed timetable.

Question 6: What is the role of local and regional Government in connection with the "Information Superhighway"? How can new services be used to boost (a) the ongoing regeneration of urban areas?

6.1 Local and regional Government should encourage the linking of formal and informal educational institutions, recreation centres, libraries, homes and workplaces to allow education to be accessible to everyone at all times. Best use of available local and external facilities should be linked with active local programmes to develop community services and community education with particular foci. These measures could relieve local hardship, mitigate handicap, and develop inter-cultural understanding.

6.2 In one run-down, inner-city Californian elementary school, which HM Inspector of Schools visited, youngsters' self esteem and purposeful writing are boosted greatly through their remote links with adults. Contact with adults working dozens or hundreds of miles away, is currently made via fax. Each pupil has been "adopted" by one working adult, who undertakes to support him or her by receiving some of their work and offering regular comment and friendly responses over fax. The effect on individual pupils' motivation and on the school's ethos is very moving indeed.

6.3 Local Government could facilitate similar developments in the UK across Superhighways. Disadvantaged youngsters, who are unlikely to see people at work in their vicinity or that of their school, could be introduced to sensitive adults at their workplace. Such adults, given suitable training, could use their interaction with pupils via Superhighway links to develop interests and motivation, perhaps even change expectations and attitudes. This could have profound and positive societal effects, especially in deprived areas.

G Goldstein

19 February 1996

SUMMARY

The application of the information superhighway will have profound effects on social, economic, cultural and political life in Britain. It will open up many opportunities for a richer life. But it brings with it a range of threats to our way of life.

The technological infrastructure in Britain is well-developed and much can already be achieved. There is, however, a need to ensure that everyone has access to broadband telecommunications.

It is possible to identify four main types of information service that will be offered on the information superhighway: commercial services aimed both at businesses and at individual consumers, entertainment services and public or citizenship information services. Each of these has different characteristics and calls for different policy responses.

British information service suppliers are, on the whole, very successful. The commercial suppliers have a strong position within global information markets. Similarly, our provision of public information services is well ahead of most other countries in Europe. Yet we cannot afford to be complacent. Global information markets are becoming more competitive and the need for public information greatly exceeds its supply.

The principle of universal service is important and steps should be taken to ensure that it is not eroded in any attempt to de-regulate and to take advantage of competitive forces. The principle of universal access can also be applied to the provision of citizenship information.

Central government has a key role to play in creating the policy framework that will enable British business, communities and households to make most effective use of the superhighway. Yet there is little evidence that the government has recognised either the magnitude of the changes or the need to take a positive lead. A first step would be to identify a clear responsibility for policy.

Local and regional government also has a role both as a provider and a user of the information services.

The impact on employment will be considerable. We feel that attention should focus on teleworking, the importance of information skills and the potential export of work in service industries.

Jointly with a number of other organisations, the Policy Studies Institute is establishing an Information Age Foundation to address many of the issues identified in this paper. The overall aim of the Foundation is to promote wider understanding of the causes and effects of the move towards a more information-intensive society and to provide a means of linking the various initiatives that have been established to cope with the changes. Within this broad aim the Foundation has five specific objectives:

- To monitor developments in Britain and elsewhere.
- To undertake research into key issues.
- To provide a forum for debate and discussion.
- To make a connection with other initiatives.
- To disseminate information about the consequences of an information-intensive society.

We invite the Sub-Committee to lend its support to this initiative.

Memorandum by the Policy Studies Institute

The Policy Studies Institute is Britain's leading independent social research organisation. We undertake a wide range of research into social, economic and industrial policy issues.

In 1989 the Institute established a programme of research into the policy issues associated with information and its growing use in society. Since then the group has developed Europe's largest programme of research into the social applications of information.

We have worked closely with the European Commission in the development of its policies towards the information services market. We have also undertaken a significant number of research projects for government departments and others in Britain. Currently we are also monitoring the development of information policies in East Asia.

We have drawn on this experience to produce evidence for the Sub-Committee.

THE INFORMATION SUPERHIGHWAY

The term *information superhighway* is a convenient shorthand for a technical infrastructure that allows individuals and organisations to send large amounts of information to each other in the form of text, audio, pictures or video. As such, the commercial and social implications are huge. Such networks are now technically feasible and in some places already exist.

Many of the services associated with the information superhighway, however, will not require a major upgrading of the physical infrastructure and can be offered over existing networks.

Information superhighway services will fall into three main categories:

- Broadcast services that require high bandwidth to the home.
- Online services that require interactivity and medium bandwidth to the home.
- Interactive online services that require high bandwidth in both directions.

This latter category, a fully fibre-optic network, is what is sometimes meant by the term information superhighway. While the UK does not yet have a fully fibre-optic network, many services can be offered which require only existing technology. It is also worth noting that market demand for fully interactive services such as video-on-demand is as yet unproven.

In terms of physical infrastructure, therefore, the current picture in the UK is a relatively healthy one. One of the most liberal telecommunications regimes in the world has resulted in a high level of investment in the infrastructure, both by British Telecom, the dominant supplier, and more recently by the cable companies. The fact that the work has been carried out by a number of different companies has, however, meant that the network is patchy and unco-ordinated.

Figures from the cable companies suggest that some five and a half million homes in the UK are passed by broadband cable. Over one and a half million of these households subscribe to cable TV or telephone services. The concern for the cable operators is that only 20 per cent of all the homes passed and eligible for connection have chosen to do so and "churn" rate (the proportion of subscribers who subsequently cancel their subscription) remains high. Despite this, the Cable Association remains optimistic that its members will pass some 14 and a half million homes by the year 2,000 and achieve penetration rates of close to half of these homes.

The main point is that the UK is well advanced in terms of physical infrastructure and the questions that remain are concerned with the applications and services that might take advantage of the networks.

There is also a role for government to promote the establishment of standards. The market can establish standards and can probably do so more quickly but proprietary technologies entrench monopoly and the establishment of incompatible systems based solely on market dominance can retard progress—the currently incompatible cellular networks provide a good example of this. Government action is required if the problem is to be avoided.

SERVICES ON THE SUPERHIGHWAY

It is possible to identify four groups of services, each of which has different characteristics:

- Commerical services aimed at businesses
- Commerical services aimed at individual consumers
- Entertainment
- Public services

Commercial services aimed at business

These are the most sophisticated electronic information services currently available. They provide the commercial, financial and technical information that it essential for the effective operation of a modern economy. In this area British companies are world-leaders, being second only to the USA.

The companies offering these information services make sophisticated use of available technologies, they generate large revenues and compete successfully in global markets. Our market position and the competitive advantage that we enjoy through the international nature of the English language are assets that should be nurtured and built upon in the future. Already, however, it is possible to see steadily increasing penetration by American companies as they take over British and European information suppliers.

We need to develop an industrial policy that will stimulate the development of British companies so that they are able to continue to compete successfully in the rapidly expanding global market for information.

Commercial services aimed at individual consumers

These are currently among the more developed services on the information superhighway. They include online shopping offered by Sainsbury's, WH Smiths and other retailers and online banking offered by Barclays.

They are sometimes promoted as the "killer applications" which will tempt millions of users on to the superhighway but, despite initial enthusiasm, the demand for such services remains unproven. There is no doubt that changes in shopping, banking and share trading will occur as a result of the superhighway, but such changes are likely to be evolutionary rather than revolutionary. Retailers have not, after all, invested large amounts of money in real estate only to see their business move to a delivery one. Most retailers are not set up for large scale deliveries of goods and the "dual-income" household at which such services are usually aimed is generally not at home to receive such deliveries!

Concerns about security of transaction remain a constraint on the development of these services, though such concerns are sometimes exaggerated. After all, many users think nothing of giving their credit card numbers down the telephone to a supplier—hardly a secure medium. Developments on so-called e-cash will undoubtedly address many of these security concerns, the question then will be the rather larger one of the implications for taxation and revenues.

Entertainment services

Many print publishers and media companies are looking seriously at the superhighway as an entertainment medium. While full scale video-on-demand and interactive services are awaiting a full broadband network, other entertainments such as computer games, chatlines and discussion fora will increasingly eat into available leisure time.

This part of the overall information market is likely to be dominated by American and Japanese companies. The Americans dominate the video and film market and Japanese companies offer the most successful computer games.

The main public policy issue concerns the question of censorship versus freedom of expression. The online environment confuses censors because it has both private and public elements and in light of that two clear principles should be observed. Publicly available material should be subject to the same laws as other content while private and semi-privately available material (such as discussion groups) should be subject to the same rules as the telephone.

Already some companies, notably Compuserve, are exercising a greater degree of control over sexually-explicit material. But leaving censorship to service providers is not a tenable long-term strategy. If we accept that it is appropriate to have bodies like the British Board of Film Censors and the Broadcasting Standards Authority, then it is almost certainly appropriate to have some mechanism to control, or at least to monitor, the standards of the material made available over publicly-accessible electronic networks.

Public services

The term *public information* can be defined in several ways. It can mean information gathered and provided by the public sector, either directly to individual members of the public or via intermediary providers, including some commercial organisations. This broad interpretation would include tourist information and, for example, ordnance survey data. A second definition would be information held and created by public sector organisations and to which the public may or may not be allowed access. Examples would include personal records, internal policy documents, and minutes of local authority council meetings.

PSI has been concerned with issues of public information for a number of years and has developed a definition of *citizenship information.* This places the emphasis on the information *needed* by the citizen from and about public bodies. Citizenship information is a crucial element in the relationship between the citizen and the state. The availability and use of information makes a reality of the social, civil and political components of citizenship.

It is possible to identify three main needs for citizenship information:

- Information about civil, social and political entitlements, rights and protections.
- Information to enable people to participate in democratic processes and to hold institutions to account; to enable critical judgement of the civil, social and political aspects of the state.
- Information on the civil, social and political responsibilities of citizenship.

Most of this information is originated by public bodies themselves, and this is likely to continue. Most of the information is provided in traditional, non-electronic ways. Only a very small proportion of the total is currently provided using communications technology.

The gap between the supply of citizenship information and the level of unmet need for it is a matter of concern. Levels of need are expected to increase in the immediate and medium-term future. New legislation; changing demographic structures, particularly the growing proportion of elderly people; structural changes in the public sector; the growing importance of Europe in our day-to-day lives; and a growing concern with openness, transparency, accountability in public life, will all increase the need for citizenship information.

There is, therefore, a pressing need to develop new services to provide information for citizenship. The benefits of a well-informed public are considerable: citizenship information is essential for democracy and accountability in government; it improves the efficiency of administration and enables people both to receive their entitlement and fulfil their obligations. Yet we are a long way from a position where the demand for such information can be met.

We need research to explore the options that will be offered by the information superhighway. We also need to analyse the likely effect of the superhighway on both the demand for and the supply of this type of information.

SERVICE SUPPLIERS

Until now, the different media and telecommunications services have been provided through reasonably distinct channels. That picture is changing, or in the current jargon, converging. Privatisation and de-regulation of both the telecommunications and broadcasting environments have allowed companies to compete in markets that were hitherto closed to them.

Increasing competition has lead companies to look elsewhere for profits. In addition, the convergence of computer and communications technologies have brought the hardware and software companies into markets that previously they ignored.

It is possible to identify a value chain for the information services sector that looks something like this:

Content creators ⟶ Content packagers ⟶ Distributors ⟶ Interface

The *content creation* market is arguably the most fragmented. It ranges from large businesses that collect and analyse information to individual scriptwriters, musicians and artists. These content creators compete in relatively narrow categories—novelists do not compete directly with musicians, for example. But they do compete with each other for a share of consumers' spending.

Until now, content creators have had to compete for places on scarce channels and media through which to reach consumers. In future they will be faced with a plethora of channels vying for their output. This means that the creators with wide-ranging audience appeal will probably be able to command much higher remuneration for its output. The steadily increasing prices paid for the privilege of screening sporting events is a case in point.

There should also be wider opportunities for specialist creators to address minority audiences. Here, however, much will depend on the extent to which it is possible to retain the notion of public service broadcasting because the market will not automatically accommodate minority interests.

The *content packaging* market consists of a variety of businesses that assemble content into products and services; provide access to the channels and marketing support to the content creators. Some would argue that these packagers hold the real key to the future development of the information market. Print publishers and film distribution companies, for example, have control not only of content, but of distribution channels. As authors and film-makers have discovered to their cost, they can play a large role in determining which books and films are a success and which are not.

There is a threat to this market however, from so-called "disintermediation." We can already see that direct access to the content providers through the Internet, raises doubts about the role of commercial online packagers such as Compuserve. The same situation could develop if consumers were able to make direct contact with authors or with film producers. If I can down-load an electronic text from a World Wide Web page set up by an author, what need have I of a publisher or a bookseller?

The content distributors and interface market are obviously closely connected, though arguably the businesses are becoming more discrete. The distributors include PTOs, cable and satellite companies. The interface providers include telephone manufacturers and makers of set-top boxes. Some public telephone service operators are still in the business of telephone manufacture though it seems more likely that most will go the way of AT&T in the US and split equipment manufacture from service delivery.

The various parts of this value chain are heavily dependent on one another and it is unlikely that any one section will develop in isolation.

The policy concerns for the supply of *citizenship information* are rather different. It is widely accepted that most citizenship information should be available free of charge, at the point of use, as an integral part of the status of citizenship. Indeed, many of those most in need of citizenship information would not be in a position to pay for it. This is not an area which will be adequately served if left to the commercial sector alone. Public bodies must take the lead in making sure these services are supplied. Government departments have begun the process-making White Papers and other documents available on the Internet, for example—but we still have a very long way to go.

This principle is well-established. Local authorities have a statutory duty to provide public library services and these are important sources of some kinds of citizenship information. Local authorities are also empowered to fund community information and advice services, such as citizens advice bureaux, and most have a long record of supporting such services. An important characteristic of these information and advice services is that they are operated independently from the local authority. This principle of independence is crucial. We should be seeking to extend local and central government's responsibility to fund the provision of information for citizenship while retaining the principle of independence.

Universal access to services

Universal access to basic voice telephony services remains an article of faith in most countries, even those with liberalised telecommunications regimes.

The choice of the term "universal service" in this context is significant. We have abandoned the old equation which suggests that public service equals public enterprise which in turn equals monopoly. We should not, however, abandon the characteristics specific to the public service, particularly, continuity, standard pricing and equality of basic access.

That said, the idea of universal service is being rethought for the multimedia world. Does it mean access to a basic telephone line or 500 cable channels? And in information terms to a photocopy of parliamentary proceedings or a CD-ROM version of Hansard? In the near future there is the possible need to consider universal service in a global, rather than a national context. As the EU slowly moves towards telecommunications policy for the single market, for example, will Swedish telephone users be expected to subsidise users in Greece or rural Ireland? And if so, do we need an international regulator for telecoms who can place such a requirement on the providers?

A more difficult question in some ways is how such universal service will be funded. There are several possibilities such as: cross-subsidisation on the part of the dominant providers; subsidising disadvantaged groups directly from taxation or from a fund to which all providers contribute.

In the debate about universal service, the importance of a competitive telecommunications market should not be overlooked and should not necessarily be seen to be in conflict with universal service. Competition in the UK market, however imperfectly developed, has undoubtedly done a great deal to lower telecommunications costs and low cost of basic services is an important feature of a universally accessible service.

An equally important aspect of universal access to "services provided for the common good" is ensuring that the services for common good are provided at all. As we explained above, public sector lead and investment is necessary to ensure that most types of citizenship information are provided. There are several ways in which this can happen, including the direct involvement of the public sector, as purchaser or provider, in all stages, from creation to delivery.

The purchaser/provider model offers a potentially effective way of offering services. Public bodies would take on the responsibility of making sure such information services are delivered, and would purchase the creation and/or delivery from other organisations, probably through competitive tender. Similar arrangements are developing in traditional public information services.

For example, health commissions have put the provision of health information services out to tender, and the Legal Aid Board is developing a franchising scheme for legal advice to be delivered by non-solicitor agencies.

The role of central government

Central government has a key role to play. Much will depend on the government's ability to create the policy framework that will enable us to exploit the opportunities that the superhighway will open up while minimising the effects of the undesirable consequences.

There is growing evidence to show that successful progress towards the application of superhighways depends on clear and effective leadership from the government. In the USA the leadership provided by Bill Clinton and Al Gore greatly accelerated the creation of the national information infrastructure. Similarly, in Europe, the initial impetus provided by Jacques Delors and the follow-up by Martin Bangemann did much to mobilise European industry behind the notion of Europe as an information society. There are many other examples in East Asia.

Yet Britain lacks this dynamic leadership. The government does not appear to be giving high priority to the creation of the superhighway. Responsibility is dispersed among a number of different departments and where ministerial responsibility has been identified it has gone to relatively junior ministers. There is a real danger that an opportunity will be lost simply because no-one was given responsibility for action.

An argument against government intervention rests on the assertion that such matters are best left to the interplay of market forces. This is a misconception. It is certainly true that the private sector has an important part to play in the creation and the exploitation of the infrastructure. But the private sector and market forces alone are insufficient.

The uncertainties associated with the application of new technologies make it difficult to plan investment strategies. This can lead to the reinforcement of short-termism and the failure to invest adequately in a technology that will underpin our future economic prosperity.

There are many issues, like the maintenance of standards of public decency, that are not amenable to resolution in the market. There are also many services, like the provision of citizenship information, that will languish without public finance.

There is the need to regulate competition to ensure that broader policy goals—like universal services or open access to networks—are ensured. There is the more extensive need to ensure that we have an effective pattern of laws and regulations that can accommodate the conditions that the technology will bring.

There is Britain's future place in global markets for information services.

There is the need to take steps to accommodate the social and economic consequences that the technological changes will bring about: changes in the pattern of employment; changes in educational needs and opportunities; changes in patterns of behaviour and inter-personal relationships.

All of these issues point to the need for government to provide the vision and the leadership; to establish norms, standards and a regulatory regime that will permit competitive forces to operate most effectively; to facilitate social and economic changes and, possibly, to initiate programmes of direct support to assist the development of activity in the private sector. In short, there is a need for government to create a framework of policies and actions that will support and speed up the transition towards an information society and to enable us to shape the information-intensive world in which we will live.

We endorse the statement in the *Communiqué* issued at the end of last year's G7 summit on the information society:

> The smooth and effective transition towards the information society is one of the most important tasks that should be undertaken in the last decade of the 20th century.

Such an important task calls for strong leadership from the government.

But leadership alone will not be enough. The government can take action in many different ways to support the successful application of the information superhighway. Here are a number of examples of actions that are being taken by our partners in Europe and our competitors outside, there are many others:

- The government can stimulate the information services sector by enabling it to exploit the information assets held by central government.
- The government can support the development of educational programmes that will equip the next generation with the skill that they need to gain most from an information-intensive world.
- The government can ensure that there are sufficient training programmes to equip all managers with the skills they will need to manage in information-intensive environments.
- The government can more actively support British information suppliers in their efforts to exploit export markets.
- The government can ensure that all relevant laws are amended to accommodate the changing requirements of an information society.
- The government can underwrite investments in companies developing new and untried services and products.
- The government can take steps to ensure that linguistic, cultural and ethnic minorities have an adequate voice in the information services of the future.
- The government can take the lead by developing a policy for citizenship information which asserts its importance and which sets out the key principles for effective information provision.
- The government can enthusiastically adopt the latest technology and in so doing, it can demonstrate the advantages to others.

None of these ideas are new. All of them are being pursued by other governments. We ignore them at our peril.

There is another very important role for the government. Within the European Union steps are being taken to develop a policy framework for the information society. The British government is making relatively little contribution to the development of that framework. Yet Britain stands to gain more than most of the other member states from an information-intensive Europe. There is a pressing need, therefore, for the government to play a full and vigorous part in the development of information policy at the European level.

THE ROLE OF LOCAL AND REGIONAL GOVERNMENT

Local and regional government can, and should, have a significant role in relation to the information superhighway, both as a user of information, and as a provider.

Information can be used as a resource to improved productivity. Local government is under great pressure to reduce costs and to increase efficiency. One way to do this is to automate clerical and administrative processes. Another is to manage resources more effectively. This calls for improved management information systems and a better understanding of community needs.

We have already explained the importance of developing access to more and better citizenship information, both about rights and services, and for accountability and participation. Much of this information is about services and activities at a local level and therefore depends on the efforts of bodies like local authorities, health trusts and TECs. By encouraging people to use its own information services, regional and local government can play an important role in the development of information skills and familiarity with the technology amongst local people and businesses.

Information provision by local authorities is known to be a factor in the success of economic development and urban regeneration strategies. As more and more businesses and other organisations become users of the information superhighway, it will become an increasingly important channel for providing information about development opportunities, and also providing access to the information sources and communications media that can improve efficiency and effectiveness.

THE IMPACT ON EMPLOYMENT

The question of the impact of the information superhighway on working practices and employment prospects is an entire research programme on its own. It is, however, worth mentioning just three unresolved issues: teleworking, the importance of information skills and the export of service industries.

Teleworking

Teleworking can be defined as work carried out remotely from a traditional office setting that makes some use of advanced communication or information technology. This includes work undertaken by home-based teleworkers, nomadic staff or satellite offices. The information superhighway obviously increases the possibilities for such work by allowing workers real time access to information; the ability to work in distributed groups or teams and the ability to work from a wide variety of settings. Less traffic, reduced stress and a better balance between home and work are some of the often mentioned benefits of teleworking. Social isolation, health and safety concerns and parity with office-based workers are some of the major concerns.

The importance of information skills

As information moves from being a factor to being the most important factor of production in advanced economies, the importance of good information-handling skills in the population at large becomes a pressing issue. It is not just that those without such skills will be locked out of employment opportunities, but even those in work will find their effectiveness reduced as they struggle to cope with information overload for which they have no filtering mechanisms. Such skills need to become part of the national curriculum at an early age.

Here we are thinking about something much more extensive than keyboarding skills or the skills needed to become an habitual user of information technology. We must begin to develop a higher order of skill. People will need to be able to identify information needs, collect and process information, analysing in order to solve problems and to reduce uncertainty. We need to become much better at evaluating the information that is presented to us. All of these skills can be developed over time—many of them being developed through the normal education process. What is required is a shift of emphasis. Information handling skills, in the broadest sense, need to be an explicit part of the national curriculum.

Export of service industries

The growth of the superhighway combined with the globalisation of businesses opens up the prospects of the export of low skills service jobs out of the UK to lower wage economies. We have already seen some of this with airline reservation systems, insurance claim checking and other routine data handling jobs being exported. An emphasis on high-value knowledge services, which put the stress on interactivity, client contact and customised services and hence are less likely to be carried out remotely, would seem to be the only solution.

The converse also applies. As the world's information system becomes more efficient, British information suppliers can make their services more readily available in markets outside Europe. East Asia, in particular, offers considerable potential for export growth.

CONCLUSION

Clearly, we are contemplating a process of major social, economic, political and cultural change. The application of the information superhighway is part of a more far-reaching development towards an information-intensive society.

This development brings with it many opportunities for economic growth; for increased social cohesion; for a richer cultural life and for a better-informed political system. There are also dangers. We could fail to win in the competitive information markets; we could fail to make the productivity gains that can come through the application of information in business; our societies could become more divided; we could find our distinctive culture being overwhelmed by that of North America while our political life becomes dominated by the soundbite and the videoclip.

We need a well-thought out framework of policies to shape the development. The overall aim should be to enable us all in Britain to make the most of the advantages that are open to us while minimising the effects of the undesirable consequences.

The framework of policies needs to be established on the foundation provided by a clear understanding of the issues and an analysis of the circumstances within which we will be operating.

This calls for a wide-ranging programme of research. We need to know much more about the workings of the information sector in the economy—we need to understand the dynamics of the markets better; we need a more thorough understanding of what is happening in the export markets; we need to analyse the factors that determine success and failure; we need to analyse the present and future skills requirements of the industry and we need to undertake the technical research that will enable British companies to develop the most innovative products.

Within organisations we need a much better understanding of the ways in which information can promote organisational effectiveness; we need, again, to understand the skill requirements of managers and others; we need to develop methodologies for information needs analysis and we need to study the different ways in which management information needs can best be met.

At the social level we need to explore further the relative effectiveness of the different ways of meeting the needs of citizenship information; we need to understand more clearly the role of information within the democratic and policy-making process; we need a thorough analysis of the factors that determine peoples' receptivity to information and we need to look at issues like freedom of information, data protection and privacy in the light of the likely shape of society in the future.

The research agenda is extensive. We welcome the announcement by the Economic and Social Research Council of its research priorities in human communication and the social shaping of technology and in knowledge and skill. But such programmes tend to address issues from an academic, theoretical perspective which is not always attuned to the needs of the potential users of research. There is, therefore, a need for focused research, addressing real issues and producing results that can be acted upon by practitioners.

There also needs to be some linkage between the various initiatives that are springing up as different organisations and interest groups begin to grapple with many of the issues that we have identified.

It is for these reasons that we are working to establish the Information Age Foundation. The initiative for this came from ELITE, a group representing directors of information technology in major British companies. But we expect to receive support from a wide range of organisations. The aim of the Foundation is to promote wider understanding of the causes and effects of the move towards a more information-intensive society and to provide a means of linking the various initiatives that have been established to cope with the changes. Within this broad aim the Foundation has five specific objectives:

- To monitor developments in Britain and elsewhere.
- To undertake research into key issues.
- To provide a forum for debate and discussion.
- To make a connection with other initiatives.
- To disseminate information about the consequences of an information-intensive society.

We invite the Sub-committee to lend its support to this initiative. A paper describing the Foundation in greater detail is annexed.

THE INFORMATION AGE FOUNDATION

SUMMARY

The increased use of information technology is bringing about fundamental changes in the social, economic, cultural and political life of Britain. The effects are already becoming apparent but it is clear that we have only begun a process of change that will make an impact on us all.

We need to understand the causes and effect of the changes much better than we do now. We also need to make connections between the diverse initiatives that are being established in an attempt to cope with the change. We need to raise the level of awareness through debate and discussion.

The Information Age Foundation is an attempt to fill this gap in understanding by:

— Monitoring developments in Britain and elsewhere.
— Undertake research into key issues.
— Providing a forum for debate and discussion.
— Making a connection with other initiatives.
— By disseminating information about the consequences of an information-intensive society.

This paper contains the rationale for the Foundation and sets out the work programme for the first year.

BRITAIN IN THE INFORMATION AGE

As we approach the turn of the century we are beginning to experience changes that are every bit as profound as those associated with the Industrial Revolution two hundred years ago. At that time, the introduction of a new range of technologies upset well-established patterns of social, economic, cultural and political life. Much the same is happening now.

We are moving inexorably towards the Information Age. The use of information and communication technologies is already having a profound effect on all aspects of our lives. It is changing the structure of our economy; it is altering dramatically the nature of work and the patterns of employment; it is affecting the cohesion of society and our sense of cultural identity and it is altering the pattern of personal relations.

In the Industrial Revolution, the developed world took raw material from the third world and made profitable processing and service industries out of it. In the Information Age the developed world is the source of the new raw material—information and intellectual property—that is being sought after by countries like China, Korea, Malaysia, Singapore and Thailand which have a vision of a future in which they act as processing hubs within a global economy.

The effects are already discernable. Yet it seems likely that we are only at the start of a long process of change. We need to understand much better the causes and the consequences of the changes that will affect us all in the next 20 years.

Without such an understanding we will only be able to react to change. We need to be able to shape the emerging society. Our competitors in Europe, the USA and Japan are developing their vision of an information-intensive society. So too are many of the newly industrialised countries that will be competing with us in global markets in the future. We simply cannot afford to let others set the agenda for us.

The social consequences

The technologies present real possibilities for improving social life in Britain. Through them, people will be able to become better informed about the things that matter to them as members of society. The welfare state will be able to function more efficiently and probably more effectively. People will be better placed to exercise their rights. They will be more able to take control over their personal well-being—we only need to consider briefly the impact that information and communication technologies can make on people's awareness of health issues.

There will also be dramatically increased opportunities for continuing education and for constructive leisure.

On a more fundamental level, the surveillance capability offered by technology could go a long way to reducing the levels of theft and low-level crime.

Against this must be set the dangers. More intensive use of information and communication technologies is likely to lead to greater social isolation as activity focuses more and more on the home. The opportunities for social intercourse that are offered by shopping, working, education and leisure will decline as more and more of these activities take place in the home. We can already see the effect on children who lead more solitary lives than did the generation before them.

Social isolation can come about in other ways. As use of the technology takes off, what will be the implications for those who through age, infirmity or lack of money are denied access to the networks. We have always expressed a token concern about the "information-poor". There is now a real danger that lack of access to information could become a defining characteristic of an underclass in society.

What will happen to our cities if teleworking becomes the predominant form of white-collar work? What, for that matter, will become of rural areas?

At an individual level, what will be the social and psychological effects of being exposed to all that information? Will we see a new form of paranoia emerge as people become concerned that they are failing to make use of the information resources that are available to them.

Can we cope with information overload?

The economic consequences

Information and communication technologies could revitalise the British economy. It could introduce a significant and lasting shift in productivity levels and could trigger a period of sustained economic growth.

By making use of the opportunities presented by the technologies, organisations can reduce costs; improve quality; accelerate the process of innovation; improve the utilisation of productive resources and target products and services better through improved market intelligence. Information could provide the fuel that powers the post-industrial revolution.

But again there are dangers. We must consider the down-stream economic effects. Companies can locate their design, administration and manufacturing processes in the lowest-cost locations. What implications will this have for established industrial and commercial centres? Companies can reduce the cost of executive travel by using video-conferencing. What effect will this have on the business travel industry?

What will be the effect on jobs? At the most basic level, will the technologies create more jobs than they destroy? Patterns of employment are already changing; new skills and competencies are needed. Will we be able to retrain and re-structure the workforce to take account of the new requirements?

What will happen if British industry and commerce lose the battle for competitive advantage?

The cultural consequences

Information and communication technologies offer very real opportunities to enrich our cultural life. Through multimedia we can exploit more fully Britain's cultural assets. We can open up museums and galleries and make them widely accessible. We can extend access to the rich stock of British films and television programmes. And we can offer the creative talent that exists in Britain new avenues of expression.

The technology can help us to strengthen our cultural identity. The flexibility of the technologies can support local and minority cultures by offering access to low-cost communication channels.

That is the optimistic view. A pessimist would point to the dangers presented by market forces and the tyranny of economies of scale. Our distinctive British culture could easily become submerged by a bland North American or, at best a Trans-Atlantic, culture.

Associated with this is the uncomfortable fact that, in the cultural sphere, quantity is usually the enemy of quality. One only needs to scan the television channels in Europe or America, or to listen to the radio, to see that although the number of channels, stations and programmes has increased, there has been a significant decline in the overall level of quality. It is difficult to see how market forces and technological developments will do anything but accelerate this decline.

The political consequences

In the political arena, information and communication technologies offer both opportunities and threats. There are real possibilities for extending democratic processes and for improving the quality of democratic decision-making.

Instead of being able to express our democratic choices once every three, four or five years, we might be able to register a vote on every contentious issue. How would this affect the operation of the political system? Would it reduce debate to the lowest popular level? Or would it actually create a system of accountability and democratic control that would give power to the people in ways that we can only now speculate about?

Such a system of continuous democratic participation could only operate effectively if everyone was well-informed about the issues on which they were expressing a preference. The technologies offer the opportunity to create such an informed electorate. Each of us could have access to briefings on the critical issues. Different points of view could be expressed and debated. Pressure groups would be able to communicate their messages. We would not be reliant on single sources of information with all their potential for bias.

Technology could change our perception of freedom of information. It really does become possible to open up access to the information processed by government. Through this alone we could greatly increase the power and influence of pressure groups.

The technologies will also bring us all closer together in the global village. Existing information and news networks have made us much more aware of famines, conflicts and natural disasters. Such awareness can only grow as communications systems become cheaper and more pervasive. What implications will this have for bodies such as the United Nations? Will it strength them as we are forced to confront the issues? Or will we become weary and retreat into the isolation of our homes and local communities?

There is also, of course, the danger that ownership of networks and content providers will make it possible for individuals or groups to dominate the political process. We might call this the Berlusconi effect. Control and openness of the networks will, I think, become a pressing political issue.

There is also the curious inverse relationship between quantity and quality. At each successive election the politicians receive greater coverage, yet we seem to learn less and less about what they plan to do. Political debate becomes reduced to the level of the sound-bite and the video-clip that can appear on the evening news. Personalities become more important than policies.

There are also dangers that our civil rights will become eroded. Improved surveillance may reduce crime levels but what implications does it have for our civil rights. Technological systems make it possible to control and manage traffic flows. In the hands of an oppressive regime, what else might they control and manage?

The policy responses

These conditions have stimulated the development of a range of far-reaching policies. In the USA, in the European Union, in Japan and many of the other countries in the Pacific Rim, policies are being developed in an attempt to stimulate and control the movement towards the Information Age. The development of these policy initiatives culminated in February 1995 in the G7 meeting on the Global Information Society.

Yet most of these policies are predominantly concerned with technological issues. They fail to deal satisfactorily with the social, economic, cultural and political consequences of an information-intensive world.

Some tentative steps are being taken in this direction. In the European Union, for example, the Commission has begun to consider the social and economic consequences.There is also a growing concern about the possible dilution of European cultures.

In Britain there are some signs that policy-makers are becoming more concerned with the changes that the use of the technologies will bring. The Programme on Information and Communication Technologies sponsored by the Economic and Social Research Council identified some of the policy issues that need to be considered and a number of other initiatives have been launched in an attempt to think through the consequences of techological change or to stimulate the take-up of the technologies (see annex). These initiatives have, however, been fragmented and the impact on overall policy has been small.

The disturbing fact is that we know relatively little about the nature and the scope of the social, economic, political and cultural changes that are in prospect. We need to advance our understanding. We need to make connections between the different initiatives. We need to raise the level of awareness of the issues. We need to provide a focus for debate and discussion.

THE INFORMATION AGE FOUNDATION

The Information Age Foundation is an attempt to fill this gap in understanding.

Aim and objectives

The aim of the Foundation is to ensure that in Britain we are able to take full advantage of the opportunities offered by the Information Age while minimising the effects of the undesirable consequences. Within this broad aim the Foundation has five specific objectives:

- To advance our understanding of the nature and scope of the social, economic, cultural and political changes that are being brought about by the move into the Information Age.
- To stimulate discussion of the policies and actions that are called for by the changes.
- To raise awareness of the consequences of the Information Age both generally and, in particular, among policy makers.
- To make a connection between other relevant initiatives and programmes both in Britain and elsewhere.
- To promote examples of good practice and to stimulate the process and take-up of innovation.

Activities

To achieve these objectives it will be necessary to undertake four main activities. First it will be necessary to maintain an overall watching brief on developments in the United Kingdom and overseas. Through this it will be possible to monitor developments, to identify shifts in policy and to become aware of novel applications.

This will, however, only provide a general overview of developments. It will be necessary to supplement this with more detailed research and investigation into issues of particular importance. Some of this research could be undertaken within the Foundation. In other cases it may be more sensible to commission the research from external experts.

The third task will be to provide a forum for the presentation, debate and discussion of ideas.

Finally there will be a need to disseminate information about the consequences of an information-intensive society. Some of this dissemination activity will be addressed to particular audiences—policy-makers are one group that the Foundation would need to target. There is also a need for more general dissemination aimed at raising overall levels of awareness.

Resource requirements

Initially efforts will need to focus on establishing the Foundation as a corporate entity and building up the programmes of activities. During 1996 there will be four main tasks:

- *Establishment* It will be necessary to form a company limited by guarantee, to register it as a charity, to develop a constitution and organisational structure and to create financial and other systems.
- *Networks* It will be necessary to establish contact with a wide range of initiatives and organisations in the UK, in Europe and in the rest of the world. We will need to build up a database that can be used to identify the scope and activities of these various bodies.
- *Membership* We will need to establish a package of membership benefits, identify potential new members and extend invitations accordingly. We should aim to have a broad range of organisations in membership covering both the public and private sectors and the producers and consumers of information and the associated technologies.
- *Activities* It will be necessary to design and launch the programme of activities. A key event will be the launch conference. In addition we should aim to organise at least two member seminars. We should also establish a briefing series for members and, possibly, a newsletter for wider circulation. We must exploit fully the dissemination and communication possibilities offered by the technology.

These activities will require a budget of at least £50,000 during 1996.

When fully operational the Foundation will require at least two staff plus administrative support. Their task should be to gather, assimilate, evaluate and communicate information about all relevant development within the UK and overseas. They should work closely with relevant initiatives and development programmes.

They should be able to pursue issues with focused investigations carried out in-house or commissioned from specialist agencies.

An important function would be to disseminate the results of this work to a variety of audiences through a programme of seminars, conferences and workshops.

In addition, resources will be required for research, conferences and seminars and for dissemination. The annual costs will, therefore, be in the order of £170,000.

Indicative annual budget	
Salaries	£80,000
Office and administrative expenses	£30,000
Commissioned research	£40,000
Conferences and seminars	£10,000
Dissemination	£10,000
Total	**£170,000**

Sources of funding

The Policy Studies Institute has already committed resources to the launch of the Foundation and it is prepared to provide accommodation and other services to enable the Foundation to become established. A number of major corporations have committed resources to underwrite the establishment costs during 1996. There are, however, many other potential souces of funding that will be explored. The issues that will be dealt with by the Foundation are the concern of a wide range or organisations and institutions.

Within government the Departments with the most direct interest are the Department of Trade and Industry and the Department for Education and Employment while the Home Office and the Department of National Heritage also have responsibilities for aspects of the information-intensive society. In addition, the changes that will come with the Information Age will have an impact on the Department of Social Security, the Department of Health and the Department of the Environment.

Two sectors of industry are directly concerned with the consequences of the Information Age. The information and communication technology industry has a direct interest in the use made of its products. Equally significant, the information services sector, ranging from publishing to broadcasting has an immediate interest.

The whole of British industry and commerce should, however, support the work of the Foundation because British industry and commerce will only remain competitive in the global economy if it takes advantage of the opportunities that the Information Age will offer.

Trade unions could well support the Foundation as it will shed light on a number of the issues that are already affecting their membership.

Finally, a number of other foundations could provide support, particularly for the research and dissemination programme. The Economic and Social Research Council also has a good record of supporting research in this area.

It should be possible to attract financial support from a number of different sources. The support could be in the form of a single donation towards an endowment. Or organisations could subscribe on an annual basis.

Organisations that provide support will be entitled to attend regular briefings and high-level seminars. Founder members would be invited to join the Council for the Foundation.

Timescale

The Foundation will be establishing during 1996, aiming to become fully operational before the end of the year. It will be launched at the Information Age Conference in the summer of 1996.

Nick Moore
Policy Studies Institute

18 October 1995
(*Revised 22 January 1996*)

ANNEX: RECENT UK AND EU GOVERNMENT INITIATIVES ON THE INFORMATION SOCIETY

Programme on Information and Communication Technologies

The Economic and Social Research Council (ESRC) sponsored the Programme on Information and Communication Technologies (PICT) through six university research centres at Brunel, Edinburgh, Newcastle, Sussex, UMIST and Westminster. It was established as a direct response to the Information Technology Advisory Panel's 1983 report *Making a business of information.* The programme concluded in 1995.

A number of the projects emphasised the need for a coordinated approach to UK policy on social and economic impacts of the emerging information society. One report, *Future imperfect: media, information and the millennium,* highlighted the number of disconnected and sectoral initiatives and the crucial importance of coherent social and economic policies to ensure that inequalities of information access do not lead to increased social division.

Now that the PICT programme has ended and the Programme's central coordination facility has closed, there appears to be no mechanism to take these issues forward. ESRC has launched a research initiative on media economics and media culture but this only deals with aspects of the changes that are in prospect.

The DTI Foresight Programme

This programme reported in 1995 through the work of 15 sector panels. Two panels—IT and electronics/communication—were merged in September 1995 under the chairmanship of Dr John Taylor who is also taking part in our discussion. All the panels have wide-ranging and, to some extent, overlapping interests. Again, it is not easy to see a coherent government-wide approach underpinning this. Alongside this are various government-industry LINK programmes, largely aimed at scientific and engineering initiatives.

THE GOVERNMENT INFORMATION SOCIETY INITIATIVE (ISIS)

This programme, which is likely to be launched early in 1996, from the Office of Science and Technology in the DTI, is intended to pursue some of the goals outlined in the government's second Competitiveness White Paper. It is concerned with promoting the ambitious and innovative use of new technologies.

THE EU INFORMATION SOCIETY FORUM AND THE SOCIAL EXPERT GROUP

The Forum was established in July 1995. Its aim is to take forward the recommendations in the Bangemann Report, the conclusions of the European Council in Corfu and the Action Plan of the European Commission. There are six wide-ranging working groups:

- The impact on the economy and emloyment.
- Basic social and democratic values in the virtual community.
- The influence on public services.
- Education and training in the information society.
- The cultural dimension and the future of the media.
- Sustainable development, technology and the infrastructure.

There are 126 Forum members, nominated by Member States. UK representation comprises a selection of different types of interest, including BT, the Federation of the Electronics Industries, the BBC, the Open University, the National Consumer Council, UNISON and the European Informatics Market (EURIM) which is represented by Lord Renwick who will be with us at the dinner on 12 December.

The Commission has also established a Social Expert Group on the Information Society. This is much smaller and is charged with producing a report before the end of 1995. The UK is represented on this group by Professor Chris Freeman of the Science Policy Research Unit at Sussex University.

The issue for the UK is how it will develop a coherent set of policies to shape the thinking in that Forum and to take on board its findings which are due to be published in a series of annual reports.

OTHERS

There is a very wide range of other initiatives sponsored either by individual government departments or other bodies, such as the FEI and the National Council for Educational Technology. The Central Computing and Telecommunications Agency has established, for example, Information 2000 which aims to explore the future impact of information technology in government.

The ESRC is also looking at a further programme in the area of the social impact of information technology as part of its themed approach to future research. The ESRC is also discussing with the Royal Society of Arts a possible joint venture on the organisation of future work following the RSA's Tomorrow's Company Programme.

There are also many international initiatives. The International Institute of Communications, for example, has established a Global Commission to consider the impact of communications technology on cultural development, while Unesco will publish a World Information Report in 1996.

Memorandum by Reuters

EXECUTIVE SUMMARY

The attached memorandum expresses Reuters concerns about government policy relating to public sector information.

The government is the largest "content provider" in the UK. New technology has the potential to transform the way in which official information reaches the public. It is vital that government policy encourages this process.

The government has a choice. It can either continue to drive this process itself by means of copyright control exercised through a system of individual licensing, or it can replicate the US model by removing copyright and other restrictions and allowing the information sector to bring the full force of its skills and resources to bear on government data. The UK has a strong information sector, including several world class companies.

In the UK, where government retains copyright in public sector information, it views the dissemination to the public of official information essentially in budgetary terms of benefit to the Exchequer. The government's underlying assumption is that the best economic return to the Exchequer results from a transaction based licensing regime whereby civil servants and would-be information licensees negotiate, on a case by case basis, a commercial licence based on the type of use to be made and on the perceived value to the licensee of the rights granted. These negotiations can, and often do, take weeks if not months, and in some cases, years to conclude. Government officials generally do their best to negotiate reasonable terms but they do not always find it easy to understand the business of the licensee. They can also be concerned about the effect that the licensees activities will have on income derived from the governments own publishing business. These negotiations act as a powerful break on innovation by the information sector in the UK.

The assumption underlying US government policy is that the interests of government, citizen, business, the information sector and the economy are best served by opening up government information to the full force of market forces. Government benefits in two ways. First, the private sector brings its skills and resources to bear on public sector information. Second, the Exchequer benefits from the growth in economic activity that is stimulated.

A key factor in the development of the information sector has been government policy in the area of telecommunication which has resulted in the UK now having one of the most modern telecommunications infrastructures in the world. The prescription applied by the government was to draw back from monopoly provision and control and allow the market to deliver the service that UK business requires.

Reuters believes thats the Government should show the same foresight with regard to government information and apply the same prescription. The social, political and economic dividends could be comparable to those now resulting from the telecommunications reforms.

Earlier this year, the government removed restrictions on the use in electronic databases of statutory material. It should now remove restrictions on the electronic publication of all official information suitable for publication.

Parliament itself could lead by example by encouraging the wider availability in electronic form of parliamentary texts.

RESPONSE BY REUTERS HOLDINGS PLC TO QUESTION 5(i)

A recent study has confirmed that:

> "the government sector is far and away the largest producer and disseminator of information in the UK, as in most othe highly developed countries".
>
> (*Ian Rowlands: "Trading in Government Information"*)

Reuters wishes to bring to the Select Committee's attention the fact that present government policy relating to public sector information is out of step both with practice in the US and, in the case of copyright, with guidelines issues by the EU. This impacts the growth of the information sector in the UK. Considerable social, economic and political dividends are also being lost.

This short paper begins by describing the position in the US, then reviews developments at EU level, and ends by examining UK policy in this area.

1. *Public Sector Data in the USA*

Copyright protection is not available for any work of the US Government. In this context, a "work" is defined as that "prepared by an officer or employee of the United States Government as part of that person's official duties". (Copyright Act 17 USC 1988).

In the US, it is now well established that public information is a public asset and a valuable national resource incapable of IPR protection. This has been given a powerful endorsement by the US Government's National Information Infrastructure Program (NII). The NII, a key component of the successful Clinton election campaign, was aimed at "universalising" the benefits of the Information Society. The US Government has recognised that one of the preconditions for the success of the NII is to ensure that "the immense reservoir of government information be available to the public easily and equitably". It has seized the opportunity to use the public data issue to make a political point that no one will be denied the opportunity to use the superhighway. For example, its strategic policy document "Technology for America's Economic Growth: A New Direction to Build Economic Strength" (1993) stated:

> "Every year, the Federal Government spends billions of dollars collecting and processing information (eg economic data, environmental data, and technical information). Unfortunately, while much if this information is very valuable, many potential users either do not know that it exists or do not know how to access it. We are committed to using new computer and networking technology to make this information more accessible to the taxpayers who paid for it. In addition, it will require consistent Federal information policies designed to ensure that Federal information is made available at a fair price to as many users as possible while encouraging growth of the information industry."

US activity has continued to gather speed. The Federal Information Infrastructure Taskforce (IITF) appointed to oversee the NII has been tasked with identifying the obstacles to electronic access of public sector data. Most significantly, a new Paperwork Reduction Act (PRA), became effective on 1 October 1995. One of the PRA's major objectives is the need to:

> "improve the quality and use of Federal information to strengthen decision making, acountability and openness in government and society . . . and provide for the dissemination of public information on a

> timely basis, on equitable terms, and in a manner which promotes the utility of the information to the public and makes effective use of information technology."

The PRA provides the clearest possible evidence of the US Government's view of public information as a public asset. For example:

> "With respect to information dissemination, each agency shall not, except where specifically authorised by statute:
>
> (A) establish any exclusive, restricted, or other distribution arrangement that interferes with timely and equitable availability of public information to the public;
>
> (B) restrict or regulate the use, resale or redissemination of public information by the public;
>
> (C) charge fees or royalties for resale or redissemination of public information; or
>
> (D) establish user fees for public information that exceed the cost of dissemination".

The Guidance Notes on the PRA issued by the US Government, observe with regret that "other nations do not necessarily share these values" and openly criticise those nations that take "advantage of their domestic copyright laws that do permit government copyright". The Notes also describe some of the practical problems that have resulted from inconsistent national IPR treatment of public sector data. (see "Memorandum for Heads of Executive Departments and Establishments" issued by the Executive Office of the President, Office of Management and Budget, 29 September 1995).

2. *Public Sector Data in the EU*

The Information Market Policy ACTions Programme (IMPACT), initiated by the EU in 1988, led to the publication in the following year of "Guidelines for Improving the Synergy between the Public and Private Sectors in the Information Market". Guideline 18 is as follows:

> " 'The public sector should, to the highest extent possible, make use of the discretion under Article 2(4) of the Berne Convention to exempt from copyright texts of a legislative, administrative or legal nature and official translations of such texts'. . . .
>
> 'Article 2(4), as revised at the Stockholm Copyright Convention, 1967, states that 'It shall be a matter for legislation in the countries of the Union to determine the protection to be granted to official texts of a legislative, administrative and legal nature, and to official translations of such texts'. The aim is to adopt the most favourable interpretation of the Convention in order to encourage the private sector to create advanced information services' ".

Following publication of the Synergy Guidelines, the Commission launched the PUBLAW programme, as a review of the legal environment of public sector information. PUBLAW I, published in 1991, *inter alia* confirmed the divergent IPR treatment of such information by Member States. In 1993, PUBLAW II contrasted the US and EU positions as follows:

> "The development of the (US) information market stems from the democratic principles of access to government information. Support for a diversity of information sources is an essential feature of government information activities. The constitutional and statutory restrictions on government copyright, and the public access mandate in Freedom of Information statutes, form part of this legal infrastructure. In practice, it means that the private sector has little restriction upon its access to public sector information for commercial use. This is in contrast to some European Member States where the existence of copyright in government information gives rise to a number of issues relating to ownership of information and contacts for the supply of public information to the private sector".

This Final Draft of PUBLAW III produced in August 1995, reinforces the conclusions of the 1989 Synergy Guidelines relating to government copyright:

> ". . . information held by the public sector should not be able to benefit from the rules of intellectual protection at least when this information has been collected for the requirements of the public service. . . ."

PUBLAW III also notes with concern that the 1989 Guidelines have been largely ignored by member states. The Report concludes that:—

> "it appears that it is the non-constraining nature of this document which lies at the root of this ignorance. . ."

The Bangemann Group Report on Europe and the Global Information Society (1994) has recommended the creation of a trans-European administrative network linking up public authorities with European citizens. Moreover, one of the objectives of the new INFO2000 programme is the "provision of equal opportunities for all individuals and businesses to access public sector information in the EU". As will be detailed in the next section, the UK stands out as being one of the most restrictive countries in the EU in relation to public sector data. Unless, therefore, UK policies are re-shaped, it is most unlikely that the UK will be in a position to respond effectively to these EU initiatives.

3. *Public Sector Data in the UK*

Earlier this year the government made an important concession in relation to statutory texts where it relaxed previous restrictions on electronic publication. Nevertheless, the UK, in contrast to the position in the US, and against the recommendations of the Synergy Guidelines, retains Crown Copyright in all government and parliamentary information. This is despite the fact that the contents page of the DTI's guidelines "Government-held Tradeable Information" states that "full account" has been taken of the Synergy Guidelines. Crown Copyright is claimed for any work "made by Her Majesty or by an officer or servant of the Crown in the course of his duties" and Parliamentary copyright is claimed for bills and Hansard. Furthermore, the British government views public sector information essentially in budgetary terms.

> "For the UK government, the central question appears to be how to meet the public expectation of free access to official information without the cost of provision having to be met by Exchequer out of general taxation. It has not yet perceived this in constitutional terms as a public right." (*S Saxby "Public Sector Policy and the Information Superhighway"*)

HMSO, which administers Crown Copyright, is an Executive Agency Trading Fund operator under a duty to meet financial targets set by the Treasury. In the case of electronic publishing, HMSO's policy in licensing public sector data is to set fees at the levels the market will bear. Its policy was described recently by Jim Wretham of HMSO's Publications Division, as follows:—

> "HMSO is the government publishing agency publishing both in print form and electronic, value-added form. We also licence other organisations to use government material. In the UK, we have the concept of Crown Copyright which covers all material produced by the government. The trend in the UK over the last few years has been the setting up of so-called executive agencies within government. The background of this trend is the government's wish to move away from funding by direct taxation and instead making these government executive agencies self sufficient from a funding point of view.
>
> "Most of these agencies have fairly demanding financing targets to meet. The HMSO is perhaps the prime example, looking at its publishing and licensing output as being a way of making a contribution to these financial targets. Most of this licensing activity involves private sector companies wishing to commercially exploit government information and paying royalties to the government. Collection of government information has a cost which in our view should be charged to the users of such information rather than to taxpayers at large." (Minutes of *"Workshops on Commercial and Citizens Access to Government Information"* organised by DGXIII in Luxembourg on 26 June 1995)

One of the results of this policy is, to take one notable example, that "Hansard costs seven times as much as its American or German equivalent and 14 times as much as its Australian equivalent." (*S Saxby "Commercial Exploitation of Primary Legal Materials"*)

The consequences of viewing public sector data primarily in budgetary terms is exemplified by the case of the Internet. In the US, the Clinton administration has embraced the Internet as a low cost vehicle to bring government and citizen closer together by promoting the widest possible use of the Internet for disseminating public data. The response of the UK has been rather different. Despite initiatives by some government departments, and notably the Treasury, the emphasis has often been on the potential threat that the Internet poses to revenues earned from the exploitation of Crown Copyright.

Thus, although the CCTA has acknowledged in its recent guidance note to government departments "Making Best Use of the Internet" that there is a growing public appetite for government material, policy documents, legislation and so forth, the same note advises government departments to restrict Internet use to documents "in which Crown Copyright need not be enforced". HMSO's Copyright Unit has added that "the material best suited for Internet use is data which (government) organisations are prepared to see freely reproduced and from which they do not need to generate an income stream". This was accompanied by a warning to government departments that might disregard this advice that they would not be reimbursed for any losses in income arising from the fact that the information has been made public over the Internet.

A further practical consequence of the application of Crown Copyright is the time consuming exercise that can often accompany applications to licence government data. Licenses must be negotiated with fees based on HMSO's assessment of the value of the material to the applicant and not, as in other jurisdictions, on the marginal costs of providing the information requested. The use that the applicant may make of the data licensed is carefully defined so that any subsequent change of usage will have to renegotiated. These procedures act as a considerable brake on the private sectors ability and readiness to create services that include government data.

In summary, whereas in other countries, and in particular the US governments have grasped the formidable political and economic implications for public sector data offered by the information superhighway, the UK information sector is handicapped by a Crown Copyright licensing regime which is based on the relatively trivial financial benefit to the Exchequer. For example, the most recent profit target set by the Treasury for HMSO was £11.9 million.

Reuters is therefore seeking a change of policy in this important area, and to follow the US example. We believe that the economic, social and political consequences for the UK could be very large.

Reuters urges Parliament to set an example by making greater use of the Internet and electronic publishers to disseminate:

- Transcripts of the proceedings of the Houses of Parliament and Select Committees;
- Calls for Evidence, including the ability to take responses electronically; and
- the contents of documents deposited in the Parliamentary libraries and which are suitable for publication.

Memorandum by the Royal Academy of Engineering

This evidence represents a collation of personal views from Fellows of the Royal Academy of Engineering. It cannot reflect the views of all contributing Fellows nor those of The Academy as a whole. It may, however, be regarded as representative.

EXECUTIVE SUMMARY

- The current Information networks have evolved in a very random way. Future developments need to have a more organised structure and an indexing system needs to be set up to allow easier and quicker access to available information.
- The capabilities of the Superhighway, which is currently a network of networks, are limited by the narrow bandwidth ("copper" network) currently used to transmit most electronic information to end-users in the UK. A comprehensive broader bandwidth network, significant parts of which will involve optical fibre, is required if an "Information Society" is to develop.
- The cost of hardware and connections to service providers must decrease to further enable widespread public access to the information networks.
- One of the key issues in the "Information Superhighway" debate is security and privacy of information. Legislation to protect sensitive data must be kept up-to-date to prevent the unlawful accessing of data despite the fact that this is very difficult to police.
- Working practices will change with more people working remotely from offices and from home. The improvement of electronic communication will also lead to less need for companies to concentrate activities close to city centres.

INTRODUCTION

The "Information Superhighway" grew from the development of the Internet in the US. The basic Internet infrastructure was put in place by the US Government to link research establishments and universities on work funded primarily in the defence sector. In the UK, the Government provides, through a scientific research budget, funding for the national network which links with the Internet structure. The existing "network of networks" is continually evolving with private operators forming and expanding the network infrastructure.

1. *What is the current form of "Information Superhighway", and how is it developing (i) in the United Kingdom and (ii) worldwide? What specific problems arise from incompatible network standards and why are these incompatibilities arising?*

The "Information Superhighway" is a loose expression for a large number of interconnected computer networks which make it possible to access and transmit information worldwide. At the present time, most people can only access this over the public telephone network. System providers exist, several being American, which provide connection to the highway through a fixed monthly subscription.

There is some dispute among Fellows of The Academy as to whether the current information networks in the UK constitute the "Information Superhighway". Information highways such as Internet can be perceived as the beginning of the Superhighway, which will need a national broadband network—in the UK this will probably take at least another five–10 years. The current system using the existing phone network is too slow when downloading large quantities of data, pictures or video. A broadband network is needed to remedy this; however it is up to the market to respond to this as the investment required for such a project is beyond the capabilities of the Government. The Cable TV operators are making a start in offering broad band connections through their new networks. There is concern, however, that the UK is not contributing enough to the development of a "World Superhighway" which needs controls and standards. The UK as yet, seems to have no policy on future global systems, where activity is currently being dominated by the US.

The so called "Information Superhighway" in the UK is made up of several networks, the universities have a partial "highway" in JANET and SuperJANET for links between universities. There is also access to the Internet, a loosely managed international network operating under a consistent set of technical and managerial principles which allows interworking between some five million (1995) estimated computer nodes. The services and facilities available on Internet are defined by and provided by the operators and owners of these host computers. The distinctive feature of the Internet as it is developing is that it is not "owned" by any one organisation. This has been a benefit in the early stages of evolution, since it has been user-led and market-led. Access to worldwide resources is available from local access providers, and the services and facilities are in general unregulated and uncontrolled. This is a totally different situation from the evolution of any previous telecommunications network. It offers major new challenges about what forms of regulation are needed in the future on such matters as copyright, fraud, or taste and decency. There is inadequate thought being given to the type of regulation required for these new infrastructures.

There appear to be few incompatible network standards at present. Modem standards are international because of international telecom standards. There have been problems with incompatible video conferencing systems, but these are now being resolved. Incompatibilies may arise in the future from proprietary software. Currently a user can switch freely between providers such as CompuServe, Demon, Pipex and Delphi, but there are concerns that these systems may become incompatible leaving a user locked into one service provider.

2. *What services are being provided, and (should be developed/would be required), within for example the following areas:*

(i) Public information;

(ii) Commerce;

(iii) Finance;

(iv) Education;

(v) Industrial training;

(vi) Health;

(vii) Social services;

(viii) Entertainment?

There are already many services available in all areas but accessing the required information is complex and time consuming. The current Internet needs a more user friendly index system if information is to be accessed efficiently. It is the responsibility of the information providers to catalogue their information adequately, in response to the market need.

(i) *Public information*

It is to be expected that large amounts of public information will be made available by central and local government according to the evolving standards of the World Wide Web, for example. More enlightened authorities or public bodies will lead the way. In the US some states already have special networks which focus on health, education and industrial training. In the future it is likely that the UK will have something similar. It is in the interest of government to promote the use of this information channel to the public, avoiding the selective message that is presented by the media.

There has already been much research into public kiosks from which the "Information Superhighway" can be accessed, some of the work having been initiated by G7. Kiosks are being used to a good extent in Japan but there are early versions also in use in France and the UK, with advanced versions under development. Kiosk development is potentially very important as their use is not confined to public information alone and could be viewed as "tomorrow's public telephone boxes".

(ii) *Commerce*

The use of the highway in commerce is likely to increase—the Internet is already widely used in this application by US and global companies for marketing and customer support. The UK needs to develop awareness in its own industry in this area. Small industries can access world-wide customer bases at low cost through the Internet. This is a potentially highly profitable area in which standards for electronic interchange of information already exist.

(iii) *Finance*

There has been rapid development of IT in the banking and finance world, but so far at the low bandwidth end of the telecommunications market.

(iv) *Education*

In education use is being made of the vast information services available worldwide. There will be a need in the near future for a bandwidth provision which in the longer term will be offset by a reduced need for paper information resources. In many schools the high cost of books has led to "one textbook" courses. It would encourage sixth form and university students to take a wider view if textbooks were available (for a comparatively affordable charge) on the World Wide Web. As yet the potential of electronic information in the education sector is poorly realised and much work needs to be done to identify the most appropriate and effective uses of this new resource.

The US government is providing funds for the development in schools and community education field. In addition, a number of trials are being put in place by institutions such as MIT on distance learning using narrowband techniques. In the UK, universities are being provided with high bandwidth access in the form of SuperJANET. BT's Campus 2000 is similarly providing access to schools. These developments need further support to reach the level available in the US where R&D for multimedia for education is receiving support at the federal as well as state level.

In the UK educational context there are, however, two serious problems. One is the high capital cost associated with the provision of PC/workstations on a scale which will have real impact. The second is the great cost related to the preparation of good electronically-based training material. There is also a great dearth of good authors for such material.

(v) *Industrial training*

There appears to be little use of the technology in the area of industrial training. There is great potential but this depends on the availability of the appropriate training material and its delivery to trainees in an economic and effective manner.

(vi) *Health*

There are opportunities for remote consultation, dependent on high quality image transfer and high bandwidth. Progress is being made in this area, particularly in the rural areas and motivated by changes in the NHS which place more initiatives in the hands of community health units.

(vii) *Social services*

Advancement in this area should be alongside public information developments. All information should be delivered in a uniform way and accessible from different public locations.

(viii) *Entertainment*

The present capacity for video-based entertainment is extremely limited because of the narrow bandwidth links to home computers. The cable television company networks offer broadband capabilities and the opportunity for video-on-demand video libraries. Although compression techniques permit moderate definition moving images to be transmitted over the "copper" network, a steadily increasing market will arise for a broadband (optical fibre) network. The possible need for improved definition, and even stereoscopic or holographic moving images will lead eventually to a need for bandwidth that cannot be provided by the copper network.

In the short-term, direct-to-home satellite services with interactive return paths over the copper telephone network will address the need for many new interactive TV services.

3. *Who will supply these services to consumers in the UK? How can the participating companies be categorised and what is the nature of the commercial relationships between them? How are suppliers likely to develop? What service standards exist and how are they likely to evolve?*

Most of the supply of services will initially be provided by British Telecom and the Cable companies but the role of direct-to-home satellites should not be forgotten as a very effective one-way broadband delivery system. The content will come from a variety of sources. In the future, normal market forces will lead to a range of competitive service providers. These providers will also be a major influence on service and technical standards, as is seen already in satellite broadcasting.

Participating companies will fall broadly into the following categories:

(a) those providing high bandwidth long distance transport capability

(b) those providing access to the core network

(c) those providing services over the access network

(d) those providing the content of the services.

Services standards are currently being set by global bodies such as DAVIC (Digital Audio Visual Council) and IETF (Internet Engineering Task Force). There is concern however that despite standards being set, it may be impossible to establish adequate consumer protection in the future because many of the services will be provided from outside the UK. There are no current restrictions on electronic information services to prevent monopolies as there are, for example within the newspaper industry. Oftel is already looking into some of these areas, and such study should be encouraged.

4. *How can universal access to services provided for the common good be secured within a commercially competitive market framework?*

Universal access is one of the most challenging aspects of the "Information Superhighway". There has to be a balance between maintaining a competitive market and regulation to protect all potential users. There is a need to dissociate the network providers and operators from the service providers. This can only be done by adopting a new regulatory regime.

The possibility of a public subscripton-based commercial service should not be overlooked. One alternative to subscription could be a licence requirement placed on the carriers to support public information, health, social services etc. on top of the money making services. There has been some consideration in the US to making access and communication available via such institutions as public libraries. It has already been noted in the USA that information which was once provided free to the public in printed form now costs substantial amounts of money when obtained electronically.

Currently the cost of a telephone connection to a Service Access Provider is too high to encourage widespread public use. In the USA this is often charged as a local call or is free. This component of the cost is comparatively high in the UK and requires increased local loop telecommunications competition to further reduce costs. Rates for usage currently vary widely depending on the level of service required.

Consideration should be given to the question of user electronic indentification number portability, whilst the number of users is still relatively low. Users would have much more freedom in the future if it were possible to change to another service provider but keep the same e-mail address.

The Internet demonstrates that "services" can be created economically and that they instantly become globally available. Government assistance could perhaps be made available to encourage, train and support "providers of services for the common good" and mild intervention or guidance, for example, in the processes of service-addressing or navigator design to make these services easy to find, although this is ultimately the responsibility of the service provider.

5. *What is the role of the central Government in connection with the "Information Superhighway" service provision, including the following areas:*

i. Leadership;
ii. Promoting inward investment;
iii. Promoting and safeguarding the interests of UK firms worldwide;
iv. Promoting network compatibility;
v. Access to Government information;
vi. Security of payment;
vii. Data protection, security and censorship;
viii. Verification of information;
ix. Promoting the development of UK-orientated software.

(i) *Leadership*

The main role of the Government should be one of encouragement. It should set an example, using electronic communication for official purposes and using the superhighway for services that are largely provided centrally or in partnership with local authorities, such as health, education and social welfare.

(ii) *Promoting inward investment*

There may be provisions for inward promotion of investment in local provision of information resources, for example not having to go through the US to access indexing information to the WWW. To some extent the Government has already promoted inward investment by giving the US cable and Bell Operating companies a monopoly in local broadband services until the next century.

A wideband (optical fibre) public access network requires a very high initial investment on which an adequate return may be delayed for many years. Consideration should be given to providing incentives (tax concessions etc.) to organisations supplying broadband switched TV services (a video library as well as broadcast) combined with access to telecommunications and information networks, where such services have significant public information or service content.

Another way in which the Government could promote investment is to aim to increase further computer literacy within the UK workforce.

(ii) *Promoting and safeguarding the interests of UK firms worldwide*

Government should have a major role in the development of a regulatory framework. The current emphasis on achieving competition at all costs leads to fragmentation and duplication of facilities. These problems will be more acute with the ongoing convergence of IT and telecom and weakens the UK in relation to overseas competitors. A number of Fellows are of the opinion that the Government's constraints on British Telecom have impeded the interests of UK firms regarding worldwide manufacturing of "Information Superhighway" infrastructure. There is little incentive for cable companies to provide an "Information Superhighway" since there is not competitive pressure for them to do so. It is unlikely that they will risk serious investment on digitalising their cable infrastructure in advance of market pressure without regulatory requirements.

(iii) *Promoting network compatibility*

The UK Government has traditionally taken a lead in providing standards for network interoperability. It is important that standards are set early before the introduction of *de facto* standards which favour one commercial organisation and restrict competition.

(iv) *Access to Government information*

The UK could perhaps use the US as a role model following US national initiatives to make "public information" more generally available (within the limits of confidentiality) for the purpose of growing new on-line infobusiness.

(v) *Security of payment*

It should be noted that while protection systems depend on the technology available at the time of their development, intruders have access to the latest technology. The Government should be ready to introduce new legislation when commercial need becomes apparent.

(vi) *Data protection, security and censorship*

Some aspects of data protection, confidentiality, censorship and fraud will be very difficult for the Government to police and legislate. It may be that the only practical solution to this problem is to specify best practice and to warn users of breaches (via the "Information Superhighway"). There is already some concern in certain developing countries that their culture is threatened through exposure of their public to the outside world via Internet, which is undermining traditional areas of government control. Technology offers solutions to such problems; for example, BT's CampusWorld educational service based in the UK offers a closed user-group of services restricting users from accessing unsuitable information.

The Government should provide active support to the development of standards and security protocols to regulate the electronic marketplace. It should, however, resist calls for censorship which could make the UK an unattractive place to keep or use data. Care must be taken that any such measures taken by the Government do not cause lack of confidence among the public.

A major issue for the future is the invasion of privacy of the individual as a result of connection to information networks. Since such networks are two-way, information may be collected from the users terminal about the user and information passing to or from the terminal. The Canadian government has made a start in this area by investigating "privacy" standards for user equipment.

(viii) *Verification of information*

Integrity of information is very important and strong measures must be taken to ensure this. This will probably require the introduction of new legislation.

(ix) *Promoting the development of UK-orientated software*

Government should not make UK-orientated information difficult to use through its commercial policies. One example of this is consumer software to handle digital maps. At present this is all American since in the UK Ordnance Survey data is costly whereas the US government does not seek to make money out of USGS data.

6. *What is the role of local and regional Government in connection with the "Information Superhighway"? How can new services be used to boost (a) the ongoing regeneration of urban areas, (b) other local economies?*

- Local and regional government have a role in fostering and developing local information services and infrastructures. Use of the highway could lead to savings in transport, health and education infrastructures and would demonstrate the benefits of an Information Society.
- One role of local and regional Government should be to provide valuable information to the electorate on services available, Parliamentary decisions, health warnings etc. Future general and local elections could even be conducted over the highway, making sufficient cost and time savings.
- The "Information Superhighway" may be expected to lead to further degeneration of city centres as financial and other institutions have less need to keep offices and staff on one spot. The stimulation to local business to use the highway as an extension of their market will allow their geographic reach to be increased at a low investment.

7. *What will be the impact of the "Information Superhighway" on working practices and employment prospects?*

- There will be an increase in tele-working which will have both economic and social advantages, such as reducing pollution by reducing the number of daily commuters. The expansion of this mode will be limited by practical and personal needs.
- The use of the "Information Superhighway" will create new activities but also streamline existing ones so that the overall effect on employment will probably be broadly neutral. If overseas companies increasingly dominate the supply of software and hardware this will continue to reduce the prospects for manufacturing employment in the UK.
- Increasing use of networked information technology can lead to the breakdown of existing patterns of employment—some of this is already happening in many professional fields of employment eg banking.
- It is likely that there will be an increasing number of one-man firms as individuals opt for more freelance working in many information technology and media related industries. Small companies will also be able to market globally, particularly in niche market areas.
- The "Information Superhighway" will allow a more highly tuned and personal set of services to be delivered to individuals. This could lead to the creation of new markets, principally in the service sector. It is already possible to obtain a number of national newspapers over the Internet; these can be personalised to highlight those topics of interest to the user. If in future such an application becomes more widely used, advances to colour printing will be required and the possibility of using re-usable plastic sheets instead of paper considered. Rapid, cheap printing with the ability to re-use the media will be essential.
- The Internet has already demonstrated the appeal and value of electronic mail. The increasing trend in electronic messaging and file transfer services will continue but if the Information Society is to evolve, cheaper user-friendly equipment, managed network services and software tools need to be developed.
- There will be a gradual move to measuring the value of employment rather than activity. Dispersion of the workforce over an electronic office requires changing patterns of supervisory approaches. In general this will lead to increased individual accountability and empowerment, and a corresponding de-layering and loss of intermediate supervisory positions.

8. *Is the dominance of the mass-market US software a threat or an opportunity? What hard commercial initiatives can be made (as opposed to "collaborative" ventures such as RACE or ESPRIT) to respond to this dominance?*

US dominated mass market software ensures that the world adopts a common standard. However, it is unfortunate that it restricts the opportunities of other countries to develop their software industries to the same extent. A considerable amount of US software is also initially sold free or at a cheap rate. In comparison, in the UK or Europe the initial costs can be very high—early high cost of new software deters buyers and prevents the product from gaining a foothold in the marketplace. Software is priced highly outside the US and mostly fails to gain market share.

UK companies, although strong in embedded software, find it very difficult to compete with US giants such as Microsoft and Lotus in the mass-market. The successful introduction of small US companies concentrating on niche markets has been achieved and so perhaps UK companies could compete in this area. There is a high level of innovation in the UK but its mass-market software industry will remain a niche activity unless there is a major commercial commitment to address the major international markets with the appropriate level of resources.

Hard commercial initiatives in software services are few in Europe because there are few medium sized companies. This is where most of the software initiatives come from worldwide. The European scene, however, consists of many small SME's and some large nationals and multinationals. UK companies should perhaps aim to produce high-value, specialised add-on software services instead of trying to compete with the US. Opportunity for the UK is immense and is assisted by the availability of the new tools for creating more effective practices in all its other successful industries of pharmaceuticals, banking, education etc. The corresponding commercial initiatives which can be made must therefore be cross-departmental and cross-industry, gaining from the synergies as well as the efficiencies which the "Information Superhighway" offers.

Although the US dominance of personal computer software and the use of English as the IT language make it inevitable that US software will be widespread, there remain significant opportunities for the UK within this market. UK software companies are already well established in the authoring of computer games on a global basis and are well positioned to serve the European market where the differences in language, culture and style are not well understood by US companies. Commercial initiatives to bring together the skills of software, advertising and media in the context of the European market would be an effective response to the current US dominant position.

Memorandum by the Royal College of Nursing

INTRODUCTION

The Royal College of Nursing (RCN) is pleased to submit evidence to the House of Lords on the application of the information superhighway. The RCN has an Information in Nursing Membership Group which brings together nurses with an interest in information management and its associated technology to raise awareness and to share experience and research in this area. The information superhighway will be extremely important in disseminating nursing research and facilitating the use of evidence based health care. This paper addresses the questions asked by the sub-committee as they apply to the health care environment.

BACKGROUND—THE "INFORMATION SUPERHIGHWAY" IN THE NHS

In 1992 the NHS Executive launched the NHS Information Management and Technology (IM&T) strategy. This strategy is underpinned by four major principles:

information should be person based—ie individual;

information should be easily shared across the NHS—ie capable of being transferred at high speed between users;

information should be secure; and

information should be collected once and used many times—ie available wherever and whenever needed.

In order to be able to easily share health care information the need for an electronic NHS Wide Network specific to the NHS was identified. This involves establishing what is referred to as a "national electronic spine" the length and breadth of the NHS. Locally trusts and health authorities will be able to develop local links to the NHS Wide Network.

As of January 1996 the national electronic spine should have been in place with local connections ready by April 1996.

Question 1 Current service provision

The "information superhighway" is commonly known as the Internet. In theory it is available and accessible free to the public. In practice access to it requires at the very least a personal computer and modem (telephone link) and a supplier who provides access at a cost. These suppliers also provide an e-mail (electronic mail) address.

There are a number of health care organisations who are making great use of the Internet through what are known as "home pages". For example one trust in the South East has placed its waiting list figures on its own home page. The Cochrane Collaboration also has a home page for its Evidence Based Medicine initiative.

One problem arises from the Internet "free for all" in so far as anyone can set up their own home page. There is no control over the quality of healthcare information available on public information pages or bulletin boards. Medical advice may be inaccurate or unsafe.

In health care there are a large number of computer systems which are incompatible. To achieve comprehensive connection to the NHS Wide Network would require considerable investment in new hardware and software. At present an "electronic box" is being marketed which will enable GPs to link to the NHS Wide Network.

The RCN is concerned that stringent standards need to be set throughout the NHS. There is at present no form of approval process for software to ensure the NHS that applications will:

(a) protect the data from corruption and unauthorised access;

(b) use data in reliable and consistent ways;

(c) provide all the local and national information; and

(d) provide sufficient hooks for new requirements to be linked in at a later date.

Question 2 Service development

The NHS Wide Network is for the transfer of patient information. Within this network it is proposed to establish an NHS internet (NHS-net). This will be for NON patient information and could be used in the same way the Internet eg e-mail; "home pages". This may be extremely valuable in the quick dissemination of information. Current methods of dissemination have recently been questioned. For example, in October 1995 the attempt to disseminate information about potential harmful effects of some contraceptive pills caused much confusion and the Departmentof Health agreed to review the information systems used to issue new health warnings.

The NHS also needs to communicate with social services and the private sector. This means that potentially patient information will need to be transferred to these agencies. However the standards within the NHS Wide Network do not apply to local authorities and the private sector. The RCN is concerned that the same stringent standards must be applied if the security of health related information is not to be compromised.

There is a major potential for the development of interactive health education materials and local access points. Work in North America shows this to be popular with parents, elderly people and patients. It could replace some face to face work or allow rapid dissemination of information, for example the issuing of meningitis data updates to all schools.

Question 3 Suppliers and service standards

The contract to set up and maintain the NHS Wide Network has gone to BT Syntegra who has sub contracted a company to maintain the NHS-net. There is also a separate company involved, called Healthlink, who were well established before Syntegra got the contract.

As part of the IM&T strategy the need for standards which attempt to ensure that security of information is maximised while the incompatibilities between the different computer systems are minimised has been identified. Some of these standards have been developed and are in use and some are now being developed.

The RCN is concerned that present systems for handling and storing patient information are inadequate. Introducing new methods of information exchange should aim to improve security and confidentiality. However security within the NHS Wide Network is not stringent enough. For example the guidance issued by the Department of Health only considered the threat from external (to the NHS) unauthorised access. The RCN shares the concerns that there is also a risk from "internal" unauthorised access and use of patient information.

The information system suppliers are also getting frustrated at the NHS Executive's slow process of deciding whether encryption (ie coding) of patient data is needed. Many suppliers could provide it but do not want to risk losing to the competition if the decision is taken that encryption is not needed or cannot be afforded.

The RCN believes that encryption should be introduced to protect privacy of information and is concerned that the view of the Department of Health is that the patient information belongs to the NHS/Secretary of State. This conflicts with nursing beliefs about patient privacy and European Union standards which are under development. In the private sector many patients hold their own x-rays, for example, with no copy held by the service provider.

Question 4 Universal access

Ensuring universal access to the NHS Wide Network will to some extent depend on standards. However there are other factors. For example, trusts will need to pay for connection to the NHS Wide Network and NHS-net. Potentially trusts looking for cost savings may decide not to pay for maintanence of the connections. Trusts developing their own in-house programmes could potentially result in reduced integrity of the security of patient information.

Another factor is the need for computerised information systems to be developed which support patient and client care rather than management processes. Many of the systems introduced to the NHS arise from the setting up of the internal market. Their applications are more suitable for contracting and for meeting patient charter standards than for nursing needs (eg assessing and recording a patient's medical history).

Investment in equipment may be easier in the larger institutions of the NHS and to achieve universal access investment in smaller institutions (eg single handed GP practices) will be needed. Some countries are experimenting with electronic network access for local rural communities by siting terminals in health clinics and social clubs. Entitlement to a specified number of hours of "free" access could be provided.

Question 5 The role of central government

The role of central government is many fold:

ensuring that electronic communication channels is part of the national infrastructure like roads and transport;

providing a regulatory framework for security standards—ad hoc, local development of these is counter productive and costly;

providing guidelines for kite marking and verifying information for public use;

thinking ahead—there are companies which are already exploring and developing satellite technology to support an Internet like function from space;

providing incentives for investment in developments related to health care as this area is not as profitable as was previously thought;

developing more efficient ways of funding major public sector IM&T projects.

Question 6 Local uses

Possible local community uses for an Internet type system would be:

setting up cyber cafés for young job seekers and unemployed people with free access to information such as jobs pages and for booking interviews;

developing jobs pages for nurses available via nursing libraries and educational establishments; or

providing information on services such as that in Tower Hamlets where street side terminals provide information about local services.

Question 7 The impact on working practices

The availability of electronic communications will enable developments in two fields—those relating to patients or clients, and those relating to employment practice.

(1) Patient/client related developments may include:

patient/client consultations via video type links so that people do not have to travel miles to see an expert (this is already happening);

complex procedures being supervised by an expert in another location (again this is already happening);

being able to consult an expert on for example brain scans without needing to move a sick patient or send the films across the country;

greater use of video conferencing—for example urgent meetings which involve individuals from different parts of the country or world;

rapid dissemination of urgent information such as drugs to be recalled;

booking an appointment with the GP from home;

booking outpatients appointments from the GP surgery—some trusts already offer this;

improvements in communication between multidisciplinary teams such as care programmes for mentally ill patients;

better coordination of care for continuing care clients at home; and

developing smart cards holding health related information.

(2) Employee related developments may include:

video conferencing reducing the need to go into the office for one meeting; employees may be more productive if they have not spent an hour travelling to work (of course not every occupation would suit this);

portable communications technology such as a laptop with a modem would enable the sending and receiving of documentation without the need for a hard copy and fax machine; and;

less office accommodation would be needed.

Question 8 The dominance of US software

In nursing the cultures between the USA and the UK are very different. The development of health related information technology in the US was in response to financial transactions and not in response to clinician's needs. In the UK the dominance of US based nursing information systems has already damaged nursing's attitude to IT. There must be incentives to develop applications that could suit the different cultures and to focus more clearly on the relationship between the nurse and the client. Until there is an agreed "core specification" for nursing and health care information systems there will be a poor return on investment.

Memorandum by The Royal Society of Edinburgh

The Royal Society of Edinburgh is pleased to respond to the Select Committee's invitation to submit evidence on the subject of the application of the information superhighway (ISH) in society. The Society recognises that the superhighway will have an impact on many aspects of society but wishes to focus its response on two areas, namely the social impact of the development of information networks and opportunities for education, with only brief comments on other aspects. The response has been prepared with the assistance of a number of Fellows expert in the technical and social aspects of the topic and draws particularly on research currently being carried out at the Research Centre for Social Sciences at the University of Edinburgh (Ref. James Stewart and Robin Williams).

The Development of the Information Superhighway

The information superhighway must be considered as much more than the creation of a "publicly accessible network capable of transporting large amounts of information at high speed between users". In addition to the necessary technical infrastructure, the ISH involves the development of a range of social infrastructures which will be driven by markets, services, regulation and skills.

Currently, the ISH comprises a range of commercial online information services, bulletin board services, multimedia and financial services which account for the majority of users, together with Internet which is predominantly used as a messaging system. The Internet, through the World Wide Web (WWW), is growing rapidly in popularity for a wide range of free information services and is challenging existing services in the commercial domain. This development puts organisational demands on the Internet which are in conflict with its existing anarchic structure.

In addition to access through commercial online services, simple, cost-effective methods of charging users for use of the network will be required as the services expand. For the Internet to meet the needs of future online information services, improved communications bandwidth will be required. The investment in the infrastructure technology is the least problematic and ultimately the least expensive aspect of the ISH.

With the development of the physical network there is a parallel development of users and services for the network. It is important to recognise two types of services, namely:

(i) Communication and data services which are functions of the network that are controlled by those who operate network technology. These include not only simple voice and data interchange but also the transmission of real time video and virtual private networks. A particular issue of note is the potential use of the network as a telecommunication medium in competition with the existing telephone companies.

(ii) Services which are delivered over the network but not controlled by the network providers. These include television, shopping, education and public information. The success of these services depends on their intrinsic value to users and the providers. The effectiveness of these services depends to a large extent on performance of the network including terminals and the skills of the users and providers.

The Impact on Business

The ISH provides the possibility for improved business efficiency and the creation of new businesses and services. It must be recognised that changes in established work practices may lead to the exclusion of some people where conventional provisions are withdrawn. On the other hand, the ISH opens up the possibility of greater flexibility in work practices, particularly with respect to home working and rural communities. The ISH will generate significant new markets in infrastructure, terminals and services. While the basic infrastructure will be created by a few large organisations, user terminals provide opportunities for many potential suppliers. It is, however, a global market where the mass production of the basic access technology will be dominated by the "tiger" economies of the Pacific Rim with the only final product assembly, as with personal computers, undertaken in the UK.

A Key Role for Government

A key role for Government is to facilitate the dissemination of knowledge and the development of understanding about technical and service opportunities. The Government should address the non-technical issues as much as the narrowly technical questions that hitherto have been the main focus of policy discussion, and must address consumption and use rather than being preoccupied with supply. This will require the promotion of public and industry debate on key issues that have broad social implications, especially privacy, confidentiality, censorship and security. These involve extremely dificult legal and political questions that need to be resolved both by national debate and at a transnational level. Government may also wish to consider the regulation of telephone services over the ISH.

Government use of the Network

The Government can also lead by example through making greater use of the information superhighway, for example, for financial transactions and social security, etc. The ISH also provides an excellent mechanism for the broader dissemination of Government information, hence improving the openness of Government. At the local level, Government has a role in promoting the network in schools/colleges/businesses which have not yet benefited fully, partly due to funding constraints but more significantly as a result of Government funding rules which mean that facilities provided from the higher education budget cannot be used to support other communities. Care must, nevertheless, be taken to ensure that any changes do not endanger the quality of service to existing academic users and that conventional provision is not withdrawn prematurely thereby disadvantaging those with limited access or skills.

Access to the Network

The issues of security and freedom of use may occasionally conflict. Of particular concern are barriers to access imposed by the US Government such as the US Export Control Regulations which not only restrict the export of certain commonly used commercial technology but also lead to the exclusion of citizens of certain countries from its use. This poses problems to UK institutions with students from those countries and will generally, if taken to extremes, inhibit scholarship and learning.

Education

Education is a key area in the development of the information superhighway where academia has been at the forefront of the development of the physical infrastructure. There is, in the short term, a requirement for investment in teacher skills and resources. This will enable the development of pedagogies and realistic uses of the technology to be discovered. The information superhighway offers enormous opportunities for education. However the continuing costs are significant and, in the longer term, there will have to be a sustained input of resources to maintain and update hardware, software and skills. Expectations that the information superhighway will allow any reduction in the education budget are extremely misleading. This is, however, an area where considerable export potential exists for software products and materials as a result of the UK's highly regarded education system and the dominance of the English language in teaching materials worldwide.

In broader terms, the information superhighway offers the possibility of extending the provision of education away from physical institutions into workplaces and homes. It is this use of the information superhighway in education that should be more comprehensively supported. For example, the whole basis for the support of learning will have to be reconsidered in the light of the Metropolitan Area Networks (MANs) currently being developed by the higher education sector.

The whole of Scotland is now covered by the four Metropolitan Area Networks linking Scottish HEIs whereas England and Wales are still only partially networked. Scotland is not only ahead in the development of its infrastructure; it is also well ahead in the area of service provision, thanks primarily to input from SHEFC and Scottish Telecom. The MANs offer new opportunities for co-operation and collaboration between institutions, but also raise a number of challenges including the development of acceptable use policies, the issue of Internet access and standardisation issues. The opportunities include, *inter alia,* support for a national electronic library, the distribution of televised lectures and the sharing of computer based teaching and learning materials. A number of UK wide initiatives, for example on electronic libraries (E-Lib) and on teaching and learning (TLTP) are already in operation. The technology will bring about a new supportive learning environment for students, providing them with the facilities for self-paced, supported learning. The opportunities for life-long learning and the export potential should not be overlooked.

The radical changes needed to implement this technology in the immediate future were debated at a recent seminar entitled "Using the MANs to Good Effect" which was sponsored by the Carnegie Trust for the Universities of Scotland and the Royal Society of Edinburgh.

Local Loop

The Local Loop, and the facility of individual homes and small businesses to connect to the network is crucial to the development of the ISH. In many cases it will be uneconomic for competition to exist in the building of this infrastructure, especially in rural areas. The Government should seriously consider non-market funding and ownership models, or alternatively regulation and policy frameworks that encourage local loop providers to support open communication standards and gateways to other networks. This is possibly the most socially valuable part of the network since in the long term it offers direct access to consumers, and offers citizens the opportunity to communicate and conduct business from their own locality.

COMMERCE AND BANKING

The ISH offers the opportunity of creating new more open markets and breaking down monopolies on banking and financial services. This could also be true for retailing, as information about goods and services can be much more easily exchanged between consumers and between consumers and retailers. The Government should encourage these developments and ensure that vested interests do not obstruct the development of more efficient and open markets.

SMALL BUSINESS

Small and medium sized businesses in some sectors will benefit directly from the development of the ISH. Although large corporations may produce the standard technologies, local businesses will install them and help users develop skills. These will also be the key businesses that will help the ISH to be integrated into society. These businesses should be supported. Money should not be spent on large scale projects to produce either hardware or software technology to compete with the major US and Asia producers.

CONCLUSION

The ISH provides a significant opportunity for the empowerment of individuals and organisations including increased employment through access to knowledge and services. Services will include a wide range of entertainment, information and transactional activities which will be driven by market forces. As demonstrated by the liberalisation of telecommunications services, an open regulatory environment is required to realise the benefits of ISH and to retain an internationally competitive position for UK business and academic research. The process of Government can equally benefit from the adoption of ISH for the better provision of information and services.

Government can play an important role in both promoting online services and using the ISH. It should provide direct support for training and for the development of the infrastructure to ensure the involvement of small businesses and as broad a spectrum of the general population as possible. Government must also ensure that, as the ISH is an international facility, UK national interests are protected with respect to freedom of access and use.

Memorandum by Mr Stephen Saxby, University of Southampton

GOVERNMENT POLICY ON CROWN COPYRIGHT

I understand that the Science and Technology Select Committee of the House of Lords is examining government policy on Crown Copyright and access to official information. I am a senior lecturer in Information Technology Law at Southampton University and a member of the Legal Advisory Board's task force on access to official information at the European Commission in Luxembourg. I have been assisting in the drafting of the Commission's Green Paper on access to official information. I have also recently completed a PhD thesis on legal regulation of the market in digital information, which is available on the WorldWide Web at http://www.echo.lu/legal/en/access.access.html.

The reason why I write is because I believe that the government has some way to go before it completes what I believe is necessary liberalisation of the market in official information. I recognise progress in establishing sympathetic licensing regimes, which are now extending towards electronic publishing. However, it is in the very licensing process itself that the log jam exists. I have undertaken a study of the position in the United States, where under the Paperwork Reduction Act of 1995, government agencies are restricted from regulating the use, resale or re-dissemination of public information or the levying of user fees that exceed the distribution cost. I believe that the abolition of Crown copyright would lead to a tremendous increase in the availability of official information and in the quality of the added value that organisations might contribute to official data when making it available to users.

I believe, however, that government has a duty to ensure that a core of official information in its primary form, is made available to the public either free of charge or at cost. This will of course include the law of the land, including statutory instruments as well as a range of quasi-legislative material. The responsibility for providing this service might be part of arrangements negotiated with the private sector. At the same time, those organisations, could add value to that core material and sell that for profit to specialist users who needed it. I would be oppposed to private sector organisations being free to restrict access to official information only on terms that require the public to subscribe to the added value service. I think there is a constitutional issue here in terms of the right of the public to access primary source data, either free or at cost, and without the imposition of investing in the value added service if they do not wish to do so.

I think there are sound economic arguments, therefore, for considering the abolition of Crown copyright as a hindrance to the development of information services and access to them. I do not think the government departments would lose much money, if at all, if such arrangements were in place. I would hope that the same arrangements could also be agreed with regard to parliamentary copyright works. Indeed, I was a little disturbed in the recent debate in the House of Commons that reference was consistently made to the provision of the printed materials to the House. I would anticipate in future that increasing volumes of official information will be provided for MPs and Peers in electronic formats, available on screens. I recognise, of course, that a certain amount of printed documentation will be required, but I was disturbed that the debate concentrated purely on the printing of works and not on how the House could be additionally served by electronic distribution of official information.

In raising these points, I am also aware that some contracts already exist between government departments and the private sector for the provision of information. I think, for example, of the service offered by Chadwick Healey and Tolleys in respect of some publications. These contracts would need to be re-negotiated in order to open up access to official information. In doing so, however, I do not believe that the costs would be very great, particularly bearing in mind the substantial cost savings that wouild be obtained if the private sector as a whole had unrestricted access to official information.

In conclusion, I believe that the development of such policy would benefit everyone—the government, because of the cost savings; the private sector information industry because of the increase in services that they can provide; users of value added services, who would be better served in a competing market; and the public at large, who would have access to a core of primary information either free or at cost in fulfilment of what should be recognised as a constitutional expectation.

Stephen Saxby

28 March 1996

Memorandum by the Scottish Office

SECTION 2

(What services are being provided, and should be developed/will be required?)

(i) *Public Information*

1. A pilot study is currently taking place on dissemination of information about The Scottish Office over the Internet. The pilot pages were created on the Internet in July 1995, and results are now being evaluated. The potential benefits include: enhanced public awareness of the work of The Scottish Office; the advantage of being seen to embrace an important aspect of Open Government; and the opportunity to receive direct feedback electronically from members of the public who use the service.
2. The information currently being provided covers a variety of subjects including local government reform, and a guide to education and training.
3. Individual Departments within The Scottish Office are involved in specific initiatives. For example, the Rural Affairs and National Heritage Division of The Scottish Office Agriculture, Environment and Fisheries Department (AEFD) has recently established a home page, which already gives access to a number of documents including The Scottish Rural White Paper.

(ii) *Commerce*

1. The Government has recognised the importance of businesses using information highways to maintain competitiveness in an increasingly global market. This then is the rationale behind Scottish Enterprise's Smart Partnerships Across Networks (SPAN) initiative which was established last year. A co-ordinated national programme, SPAN is a partnership between Scottish Enterprise, Highlands and Islands Enterprise, their Local Enterprise Companies and other public and private sector organisations to help Scottish companies capitalise on the business benefits of global information networks.

(iv) *Education*

1. The development of information highway services in Scottish education is being driven by the Higher Education (HE) sector. The Call for Evidence begins by defining "information superhighways" only in terms of publicly accessible networks, and while it is debatable whether this definition actually includes the SuperJANET and the Metropolitan Area Networks, it is, however, clear that these will none the less be the main items of interest.
2. The Higher Education (HE) sector has invested heavily in recent years to develop its own Information Superhighways. This investment has largely been three pronged through;
   - — The Joint Information Systems Committee (JISC), set up collectively by the Higher Education Funding Councils (HEFCs);
   - — The HEFCs themselves; and

— Individual Higher Education Institution (HEIs).

3. JISC spends in the order of £17 million annually on the development and support of the Joint Academic Network (JANET) and the newer, more advanced SuperJANET. JANET, while not a "Superhighway" in the sense that it is of limited bandwidth, does offer extensive coverage (over 50,000 computers covering all HEIs, the Research Councils and some industrial sites) and allows e-mail, access to remote computing facilities and information services and access to the Internet.

4. SuperJANET, which was started in 1993, is one of the United Kingdom's first true Information Superhighways. A world leading network, SuperJANET is capable of handling real time multi-media traffic enabling the transmission of sound and video as well as text and numeric data. This will allow Institutions to implement new applications in such areas as the following:

— Distance learning, remote access to lectures, demonstrations and course materials;

— Collaboration between geographically separated HEIs and other organisations;

— Remote access to complex databases containing sound and vision or representations of rare or valuable documents; and

— Visualisation of the output of complex supercomputers (such as Edinburgh University's Cray T3D.

5. Not all HEIs are connected to SuperJANET. In Scotland, the Scottish Higher Education Funding Council (SHEFC) allocated £2.5 million in 1994–95 towards the cost of establishing four Metropolitan Area Networks (MANs). The MANs comprise broadband fibre optic links, laid by Scottish Telecom, linking all HEIs in each of the four MANs; Edinburgh and Stirling, Glasgow, Fife and Tayside, and Aberdeen. In each of the MANs at least one of the HEIs has a SuperJANET connection thus allowing all HEIs in the MAN access.

6. Additionally, SHEFC has recently funded the direct interconnection of the four MANs to form a Wide Area Network. Funding has also been allocated to 30 projects which will further exploit the high speed and capacity of the developing MANs and the Wide Area Network. These projects include:

— Establishing video-conferencing facilities in HEIs;

— Developing a multi-media music network for use as a resource in performance, composition, research and interactive distance learning;

— Creating "web servers" for placing information on the Internet;

— Building computer links between medical schools and teaching hospitals; and

— Establishing a link from Inverness (Raigmore Hospital) to the Aberdeen MAN, which could act as a point of presence for learning in the Highlands and Islands.

Funding will also be provided for staff training in the use of these new facilities. In total, SHEFC has committed around £8·5 million to developing the MANs.

7. The development by SHEFC, JISC and the HEIs of the current networking infrastructure in Scotland has clearly proceeded at a rapid pace. What further developments may be required are not sharply focused at present. Institutions are still in the learning phase and many of the projects associated with the MANs and SuperJANET are still experimental or pilot projects (eg use of the Asynchronous Transfer Mode network protocol, video-conferencing). Other initiatives, such as the Teaching and Learning Technology Programme (TLTP) will also develop with the development of the superhighways. TLTP, launched in 1992 and being taken forward by the HEFCs has funded some 76 projects aimed at developing courseware for flexible and open teaching using IT.

8. In the recent Government Consultation "Superhighways for Education" many HEI responses identified a lack of international connectivity (especially to the USA) as a growing problem. The narrowness of international bandwidth, in addition to increasing Internet traffic is resulting in increasingly slow data transmission.

9. The comments above focus largely on developments in Scottish HE, as it is assumed that DFEE will be submitting their own evidence covering more general developments in HE and indeed in the education sector as a whole. On the latter point, the "Superhighways for Education" consultation mentioned above shows the four education departments to have taken the initiative in consulting with a wide range of parties in both education and industry on the role of information highways in education.

10. It is assumed the DFEE will cover the "Superhighways for Education" consultation in full detail, however, it is worth summarising the priorities established from the exercise as follows: raising the general level of IT capabilities in schools, FE colleges and initial teacher training; developing high quality on-line education applications and services; developing the infrastructure of equipment and connectivity. The Government committed itself to: support and encourage the piloting of new communications technologies in education; to make available resources to enable continuing provision of equipment and training; to liaise with industry to promote the development of additional on-line applications and services; and to work with the Higher Education Funding

Councils to review progress on the SuperJANET project and to disseminate the outcome as widely as possible. The Government will also look to the communications companies and providers of on-line services to ensure that institutions are not deterred from connecting to networks because of high service or product costs.

11. The Consultation Paper also invited industry/education partnerships to submit projects for evaluation, and two Scottish projects were accepted. One will assist small rural schools in Argyll and Bute to use desktop conferencing to support learning, curriculum development and staff development, while the other will focus on the development of collaborative learning for able pupils.

(vi) *Health*

1. For the health area, the inclusion of the term "publicly accessible" within the definition of "information superhighway" severely restricts the services and applications which might be cited. There is of course a need to protect the confidentiality of all patient-related transactions which might be transmitted across networks. The NHS is in the process of putting in place extensive network facilities to support the operation and management of the process of health care. These networks will support increasingly important links between health carers—for example GP to hospital links for laboratory results, radiology results and appointment booking systems. Direct support for medical care will be developed using telemedicine techniques.
2. Access to the health service networks from public service networks will be possible but only to authorised users of specific systems. Systems and databases which are likely to be made available for public access include information services about health, health promotion, the health care process, health organisations and products such as drugs. That kind of information could be made available under an Internet-type facility.

Scottish Office Education and Industry Department
January 1996

Memorandum by the Society of Public Information Networks (SPIN)

SPIN (Society of Public Information Networks), a company limited by guarantee, aims to provide a forum for the discussion of all matters relating to electronic public information (EPI) provision and to act as a voice for all those organisations, companies and individuals who have an interest in the field. SPIN currently has a membership of around 150 local authorities, other public sector organisations, voluntary organisations and private sector companies. It forwards its aims through meetings, an annual conference and exhibition, its periodical "EPI Today", and through liaison with government departments, agencies and other bodies.

SPIN has grown from a local authority base and it is still the case that the majority of members come from local government, where there is a considerable body of experience in managing and providing EPI systems and in the associated supporting partnerships with information providers and the EPI industry. Local authorities have and continue to provide a lead role in the provision of public information by electronic networked systems. SPIN believes these form the best currently available model of EPI systems using network technology and constitute a substantial body of experience in terms of how to best organise information for electronic delivery to the public and also in terms of knowing what information is used and demanded by the public.

Local authorities are also providing a lead by developing information strategies which recognise that content is as important as technology, if not more so. There are a growing number of examples of such strategies (Manchester, Hull, Rotherham, Norwich), including those which take a broad view of the scope in terms of both geographic coverage and the partners involved. The linking of information flows and information transactions, and economic and social regeneration is very strong. Such strategies would be more effective and provide a more consistent approach if set within the context of a National Information Infrastructure.

It is possible to provide examples of good practice where such information systems are overcoming disadvantage through geographical location and ability to access more traditional sources of information during office hours by the provision of terminals in remote sites that can be accessed 24 hours per day. Job vacancy details can be distributed through areas where there is high unemployment and the payment of public transport charges to visit a Job Centre is seen as a barrier. The use of multi-media in the form of sound and images both graphic and moving, enhances the information transaction and makes it more meaningful to all types and ages of user. It is significant to note that while there are examples of good practice there are no standards of service provision.

Equity of access to information is maintained by public EPI systems with terminals being placed in public libraries, sports centres, council offices and other public places including actually on the street by using special vandal proof kiosks. Such an attitude to access points is necessary to avoid the risk of a significant proportion of the community being disenfranchised by becoming the information poor. Providers of existing EPI systems have recognised this and planned accordingly.

There is a danger that local authorities will not be able to maintain their role at the forefront of EPI systems because of a lack of funding to invest in new superhighway technology. Local authorities should be encouraged to enter into partnerships with the private sector, bringing local information and expertise to match the commercial investment in infrastructure. Central government needs to be a prime mover in this.

The pioneering role of existing local authority EPI systems should be recognised and used as a base for the development of future superhighway systems. Why discard the expertise, the knowledge of user needs and the partnerships with information providers when what is needed is investment to upgrade. Much would be wasted by unnecessary reinvention of wheels.

For SPIN's part there is a continuing need for discussion, sharing of experience, and a common voice which will grow as EPI systems become an essential feature of the way we carry on our daily lives and conduct the necessary information transactions with local and central government. SPIN is willing and able to offer its contacts and membership base as a measure of expert opinion in the information superhighway debate.

Letter from the Standing Conference of National and University Libraries

SCONUL represents all the university librarians in the United Kingdom, the senior managers of the British Library, and the librarians of the National Libraries of Scotland and Wales. (It also represents their counterparts in Ireland.)

SUMMARY

- This evidence relates mainly to education and public information.
- Universities are well ahead in the use of superhighways mainly thanks to central funding for SuperJANET.
- This success suggests that central funding for similar infrastructure for colleges, schools and public libraries would save money overall.
- Copyright has become even more important in the digital environment and needs to be protected.
- On the other hand the copyright-holders' wishes for strengthened controls must be balanced against the public interest in relatively unrestricted access to information for private or educational use.
- Privacy in the use of information is important, too, and records should not be kept of individual uses of information delivered by the superhighway.
- Skilled people will be required to manipulate and retrieve information for others; sheer bulk of information available is not in itself good (people need the right information, not simply more information).
- The superhighway provides the opportunity for government to take a lead in making government and public information available widely, rapidly, and at a low cost for private and educational use.

Toby Bainton
Secretary of SCONUL

22 February 1996

Memorandum by SCONUL

EDUCATION

Recent and current experience with SuperJANET leads us to believe that higher education institutions will seek vigorously to exploit the potential of the superhighway to the full, either on their own or in collaboration with commercial companies. At the risk of appearing complacent we suggest that universities enjoy a unique combination of technical expertise side–by-side with imaginative thinking towards exploitation; and have the added advantage of a powerful superhighway already in place.

In further education and in schools, should they be connected to a superhighway, we envisage a greater degree of commercial development of products and services, in collaboration with the education sector as a whole. The provision of central funds for SuperJANET has been a resounding success, and this example could be followed in further education and in schools. Central funding for a large-scale connection could save much public money. Further "top–sliced" government funding for superhighway connection for public libraries, as well as education, would go a long way towards "universal access to services provided for the common good within a commercially competitive market framework". It would undoubtedly lead to a great deal of cost-effective and high profile collaboration, in particular in large metropolitan areas.

The penultimate point seems to us very important. Digital communication permits a publisher to have unprecedented control over the use of his material. Whereas a printed book or journal, once purchased, can be viewed by large numbers of people without further payment, a publication distributed over the superhighway can, if the publisher so decides, be viewable only by an individual who has paid a fee. It is not in the public interest for information to be very tightly controlled in this way, nor is it ethical for publishers to maintain records (for marketing or any other purpose) as to which individuals have consulted which material. In the digital environment such records are technically possible. Copyright in published material must of course be adequately protected, but adequate protection must not be advanced as a reason to restrict unduly or to monitor the private or educational use of information.

COPYRIGHT

As the use of published information is fundamental to education, we have special concerns about copyright. We are firm in our belief that copyright must be upheld in the superhighway environment, where perfect digital copies, in virtually unlimited numbers, can be made with relative ease. Fear of piracy within educational institutions can, however, be exaggerated. Institutions, and their libraries, acting in good faith, with suitable rules and controls, do not in our view offer a sufficient threat to justify highly restrictive distribution of information. The nationwide licences already negotiated for higher education by CHEST (the Combined Higher Education Software Team) are good examples of widespread educational distribution over networks of commercially-produced publications. Such licences are paid for and have worked well for both producer and consumer. Whilst copyright is the proper key to the protection of investment in publications, the balance of protection must not, in our view, be readjusted too far in favour of the publisher. The public interest requires protection too in relatively unrestricted private and educational use of information.

On the particular issue of multimedia products there are arguments for carefully controlled relaxation of copyright in particular circumstances. (It currently appears that the creation of multimedia products is unduly hampered by the need to gain a large number of copyright permissions from a great variety of sources.) This topic could benefit from expert examination.

WORKING PRACTICES AND EMPLOYMENT PROSPECTS

We cannot predict changes in working practices with great accuracy, but we emphasise that mere connection to a superhighway does not in itself entail a massive increase in the value of the information available. Connection of schools and libraries, for example, will need to be accompanied by training of existing or new staff in order to exploit the connection. The information on the Internet is not systematically arranged, and skill is required to use it without waste of time. We agree with paragraph 46iv of the Education Departments' publication (1995) *Superhighways for education: the way forward:* "institutions would be wise to plan for at least the same amount of investment in training and technical support as they do for equipment, connectivity and software".

PUBLIC INFORMATION

There is a special public interest in making government information freely available over the superhighway network. Subject to safeguards against commercial exploitation, there would be great advantage in making available all information collected at public expense free of charge in libraries (with minimal fees paid by libraries) and at low cost for private or educational use. It is equally important for government information to be available quickly and here the superhighway provides a great opportunity.

Letter from the Teacher Training Agency

Thank you for your letter of 29 February inviting me to submit written evidence for the enquiry into the *Information Superhighway: Applications in Society.*

The purpose of the Teacher Training Agency is to improve the quality of teaching, to raise standards of teacher education and training, and to promote teaching as a profession in order to improve the standards of pupils' achievement and the quality of their learning.

The Teacher Training Agency was established on 21 September 1994 under the Education Act 1994. The Agency funds teacher education, accredits providers of initial teacher training, provides information and advice about teaching and teacher education and carries out, or commissions, research designed to help improve standards of teaching and teacher education. Its functions relate to schoolteachers in England (and in Wales, by invitation of the Secretary of State for Wales).

The Teacher Training Agency is very much aware of the opportunities that the development of new communications technology presents for education. The emphasis which the new National Curriculum Orders give to IT both as a subject in its own right and as an integral part of every other curriculum subject underpins the belief that every child in this country should have the opportunity to achieve high standards in all aspects of information technology and that IT should be part of the educational entitlement of every child from the earliest age.

If that entitlement is to be delivered then it is vital that we have a teaching force with the commitment and expertise to develop and support pupils' IT capability at every Key Stage and across the curriculum, with access to equipment and software which is sufficient to achieve the task.

In addition, the TTA is concerned to ensure that IT is used effectively in the delivery of both ITT and INSET. The potential of IT networks to help improve communication across schools and training providers is great.

The Teacher Training Agency notes the recommendation made by some respondents in the second DfEE Superhighways for Education report that there is a "need for initial teacher training institutions to be fully involved in superhighway developments, perhaps through specifying minimum training requirements for new teachers in network literacy". In relation to this issue, I would make the following points:

(i) The Secretary of State's criteria for initial teacher training courses are set out in DFE Circulars 9/92 and 14/93, covering secondary phase and primary phase courses respectively. Each set of criteria includes a broad framework of the competences required of newly qualified teachers (NQTs). In relation to IT, newly qualified secondary teachers should be able to "demonstrate ability to select and use appropriate resources, including Information Technology". Newly-qualified primary teachers should be able to "make constructive use of information technology and other resources for learning". The TTA is currently reviewing whether these requirements remain sufficient as part of its work on the development of national standards for the profession;

(ii) although some initial teacher training (ITT) partnerships are providing trainee teachers with the opportunity to develop their skills, knowledge and understanding; most but not all ITT providers currently have access to the information superhighway. Much ITT is now carried out in partnership with schools or entirely in school, through the school-centred ITT scheme (SCITT) and the licensed teacher scheme. Not all schools have access to the information superhighway;

(iii) given the emphasis the new national curriculum orders give to IT, ITT providers would be expected to take the opportunity to use the Internet in support of teaching and learning, whenever possible and appropriate.

The Agency notes the identification in the second DfEE Superhighways for Education report of the need "to continue to raise the general level of IT capability in schools, FE colleges, and initial teacher training" as the first UK priority "to ensure that the take-up of superhighway developments in education is successful" (paragraph 39) and that the Government expects the TTA to "review arrangements for teacher training to ensure that they keep pace with technological developments. The TTA has already identified, as a priority, support for teachers to exploit the potential of IT".

In relation to these points, I can confirm that the TTA is committed to developing a strategy for IT across teacher education and in particular, is seeking to explore the further potential of using IT in both initial teacher training and continuing professional development. This will focus on: improving the dissemination of information; improving communications across partnerships eg between schools and HE providers; improving the quality of training; and adding to the diversity of training routes. In addition, the TTA is committed to the following areas of work:

(i) it will be co-producing with the National Council for Educational Technology (NCET) a television programme on IT in ITT, scheduled for transmission on BBC2 at 4.30 am on 1 May 1996. The title of the programme will be Networking Teacher Education, its purpose is to alert viewers to the potential of IT to enhance both pedagogy and communications;

(ii) it plans to work with NCET to map current initiatives under way in ITT, to help inform decisions as to what further contribution the two bodies can make in this field;

(iii) it will, in consultation with interested parties, clarify the standards for the award of Qualified Teacher Status (QTS) so that they will provide more rigorous, and less ambiguous expectations of newly qualifed teachers including in relation to IT capability. We need to be clearer about the knowledge, understanding, skills and attitudes we expect of newly qualifed teachers (NQTs), so that we can help improve training and sharpen the attention paid in initial teacher training courses to subject knowledge;

(iv) it is piloting career-entry profiles of competence for NQTs, based on the competences set out in DFE Circulars 9/92 and 14/93, which refer to an NQTs' ability to use IT as a resource. The profiles will treat IT as a core subject for primary teachers in respect of the subject knowledge requirements. The profiles will help inform decisions about priorities for induction training and deployment. All NQTs will have such profiles from 1997;

(v) it is developing national standards for four key points in the teaching profession: newly-qualified teacher; 'expert' teacher; 'expert' in subject leadership and management; and 'expert' in school leadership and management. The standards will clarify the competences required at these levels including the IT-related knowledge, skills and understanding required. The standards will be ready by Spring 1997;

(vi) it will continue work in support of the use of IT to improve pupils' achievements, identified as a national priority area for teachers' continuing professional development. This will involve developing criteria to help teachers identify their training needs, establishing ways of securing the quality of the training provided and helping schools to measure the impact of that training in the classroom. This will help schools to target and make best use of grant and other sources of funding to support IT-related professional development activities;

(vii) it will ensure that IT issues are taken fully into account in the development of the National Professional Qualification for aspiring Headteachers (NPQH). This will set a rigorous national standard for headship. The Agency is presently consulting on options for the Qualification, together with a draft standard for new headteachers. Trials will follow and the NPQH will be in place for academic year 1997–98;

(viii) it is currently considering its research priorities. These are likely to include the use of IT in the classroom to support teaching and learning. In particular the Agency is interested in the use of IT in relation to improving literacy and numeracy and the effects of IT on pedagogy;

(ix) it will be holding seminars and workshops for teachers and ITT and CPD providers in order to further promote the use of IT in ITT and CPD;

(x) it is currently operating a modest capital bidding programme for SCITT groups and has been able to support a number of initiatives within individual training consortia designed to link the schools together electronically via the Internet. In addition, the Agency intends to network all schools within individual SCITT groups that are not already linked through e-mail and other networks.

In relation to the perceived need to provide in-service training for substantial numbers of qualified teachers to enable them to exploit the potential of the information superhighway for educational purposes, and your request for the TTA to provide information on the size of the problem and the ways in which it may best be addressed, I would agree that there is a general need to raise the IT capability of teachers if we are to make a reality of the superhighway. This is needed across broad fronts:

(i) all teachers should be encouraged to acquire a basic level of personal skill in the use and application of IT within their work. The application of IT to administrative tasks completed by teachers could create more time for teaching if teachers are sufficiently confident and skilled in its use eg, through the DfEE multimedia portable computers pilot which will provide insights into teachers' own IT skills and confidence;

(ii) all teachers need to be knowledgeable and skilled in the application of IT as an aid to learning and pupils achievement. In some areas of the country, particularly where schools have high levels of IT equipment, teachers lack of skill and knowledge means that the full potential of that IT equipment is not being realised. A basic knowledge and skill level would also ensure that teachers make informed decisions about when it is appropriate to use IT. Purchasing decisions on hardware and more importantly software would be made on a better basis;

(iii) teachers who currently operate as the leading IT specialist in a school will require a higher level of knowledge and understanding. Similarly, school leaders need to be trained in both the curriculum and administrative potential of IT and related technologies;

(iv) there is also a broad need to ensure that all members of the teaching profession are aware of the potential impact of the superhighway on the life of pupils. Teachers need to understand that they are preparing youngsters for a world in which information will be available from a wide range of sources and in a variety of forms;

(v) as the information superhighway becomes more readily available in schools, its potential for changing communication and pedagogy will become realised and the level of demand for access will increase;

(vi) it is clear that demand for access to the information superhighway is already increasing and, as it becomes more commonly available in schools, its status will rise.

In relation to the scale of the problem, a DfEE Statistical Bulletin published in February last year (DfEE Statistical Bulletin 3/95) revealed that currently only 34 per cent of secondary and 56 per cent of primary teachers use IT regularly in their teaching. In addition, only 35 per cent of secondary school teachers and 25 per cent of primary schools teachers reported that IT had made a significant contribution to their teaching and only 40 per cent secondary and 30 per cent primary schools reported that IT had made a significant contribution to pupil's learning.

Even more interestingly, however, is the National Council for Educational Technology's report that these figures have not changed significantly since 1989 even though the number of computers in schools has risen considerably.

The OFSTED data which relate to the capability of our teachers who are actually teaching IT are equally concerning. OFSTED's review of inspection findings in Information Technology noted that in both primary and secondary Key Stages the majority of teachers are not qualified to teach more than a limited range of the Programmes of Study for IT. As the statistics show in all key stages IT teachers command of their subject lags behind when compared with the command other teachers have in their subjects.

In Key Stage 2 the schools obtain the following percentage distributions of grades for teachers' command of the subject:

	v good (1–3)	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*v poor*
All subjects:	(50)	2	17	31	31	14	4	0	
IT:	(31)	1	9	21	24	30	14	2	

In Key Stage 4 the schools obtain the following percentage distributions of grades for teachers' command of the subject:

	v good (1–3)	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*v poor*
All subjects:	(86)	18	46	22	11	3	1	0	
IT:	(67)	11	31	25	21	7	4	1	

Grade 4: Strengths and weaknesses balance

Although the overall picture is complex and in many areas far from gloomy, figures such as these must concern us.

In relation to the ways in which the situation can be addressed, it is clear that one of the most powerful ways of encouraging teachers to use IT in the classroom is to provide experiences where teachers use IT in order to take their own development forward. Opportunities for this must be taken at every stage of a teacher's professional life: as part of initial training, induction and continuing professional development. To facilitate this, as I have already outlined, the TTA has asked its working groups on national standards to discuss and make recommendations on the level of IT capability that should feature within the standards for each of the four key points in the profession. In addition, the other areas of work to which the TTA is committed, and which are outlined above, will also serve to address the situation.

Yours sincerely

Anthea Millett
Chief Executive

Memorandum submitted by Telecential Communications

1. *What is the current form of the "Information Superhighway" and how is it developing (i) in the United Kingdom and (ii) worldwide? What specific problems arise from incompatible network standards and why are these incompatibilities arising?*

Core networks have substantial capacity for high speed data transfer, but the availability of high speed access links from home and business is very limited and expensive.

Network standards must be related to the services to be supported. These are as yet undefined, but may well include significant multimedia content with demands different from those of traditional data transmission.

2. *What services are being provided, and should be developed/will be required, within for example the following areas:*

(i) public information,
(ii) commerce,
(iii) finance,
(iv) education,
(v) industrial training,
(vi) health,
(vii) social services, and
(viii) entertainment?

High speed access to the areas described ((i) public information, (ii) commerce, (iii) finance, (iv) education, (v) industrial training, (vi) health, (vii) social services, and (viii) entertainment?) will be a prime driver in the coming years. With this access, will come substantial growth in the provision of these services leading to demand for even greater bandwidth. Education and training will be prime motivators as the new network infrastructures allow for and facilitate lifelong learning. These new networks will support educational and economic opportunity across social and geographic boundaries.

3. *Who will supply these services to consumers in the United Kingdom? How can the participating companies be categorised and what is the nature of the commercial relationships between them? How are suppliers likely to develop? What service standards exist and how are they likely to evolve?*

Network operations are ill-equipped and disinclined to become suppliers of content. They wish to operate bearer networks which can be used by many suppliers. Companies can be categorised as network operators, service (content) providers, and applications/systems integrators.

Suppliers and services are likely to develop in niche markets where there is high economic utility for the service, and the use of such services will then broaden as costs reduce and wider applications become apparent.

Service standards barely exist. They will evolve through the needs of the early adopters of services.

RELATIONSHIP BETWEEN NETWORK OPERATOR AND SERVICE PROVIDER

Traditionally those two have been the same company. This has the effect of limiting the development of both networks and services to combinations which are syngergons to each other and to the interests to that company. The connectivity provided by a true superhighway will allow for the provision of services by parties unrelated to the network operator. This freedom presents a better opportunity for new services to develop, and provides a better incentive for the network operations to construct networks of high capability and open connectivity than in the traditional situation.

A regulatory environment which recognises this and fosters a free market in service provision (through standards and the licence conditions of operators) is likely to be more beneficial to the rapid development of both services and networks than one which allows a high degree of linkage between the two functions.

4. *How can universal access to services provided for the common good be secured within a commercially competitive market framework?*

Once commercial usage has paid for (or justified the investment in) the infrastructure, access to services for the common good will become available on the margin. Where there is not a commercial usage to provide justification for the access connection this will not occur without some support or stimulus.

5. *What is the role of central Government in connection with the "Information Superhighway" service provision, including the following areas:*

i. leadership
ii. promoting inward investment
iii. promoting and safeguarding the interest of UK firms worldwide
iv. promoting network compatibility
v. access to Government information
vi. security of payment
vii. data protection, confidentiality and censorship
viii. verification of information; and
ix. promoting the development of UK-orientated software

Leadership—Vision for national development and perceived benefits (eg for teleworking education etc) Legislation/Regulation regarding specific technologies should be avoided.

6. *What is the role of local and regional Government in connection with the "Information Superhighway"? How can new services be used to boost (a) the ongoing regeneration of urban areas, (b) other local economies?*

By co-operation with new infrastructure projects, availability of infrastructure will affect companies' choice of business locations. High technology development may be hampered in areas wihout super highway access.

7. *What will be the impact of the "Information Superhighway" on working practices and employment prospects?*

The Information Superhighway will enable teleworking and dispersion of companies' operations. Enhances mobility of labour (without requiring mobility of location) and encourage training through interactive distance learning for both employed and unemployed persons. Specialist training institutions will also have greater opportunities to develop.

8. *Is the dominance of mass-market US software a threat or an opportunity? What hard commercial initiatives can be made (as opposed to "collaborative" ventures such as RACE or ESPRIT) to respond to this dominance?*

This reality reflects the gestation of the industry. As new applications develop, particularly through those initiatives in the UK, their dominance will erode.

Memorandum by John Tomlinson MEP

In submitting evidence to the Sub-Committee on Information Superhighway: Applications in Society, I do so neither as a technical expert in the field of new technology, nor as someone with a vested interest in a particular aspect of it or a particular company or product. I approach the subject from the point of view of a politician who has realised the ever increasing role that such technology has within our society, and in particular, the revolution in communication and information provision that it is certain to create in the coming years.

For me, in political terms, the Internet represents equalised access to information and therefore transparency. In a world where there is a tendency at the moment to concentrate information in the hands of a privileged few, the Internet is perhaps *the* tool with the most potential to reverse that process. It is cheap, efficient and highly adaptable way to make available large quantities of information in textual, graphical, and audio-visual format. As a method of communication, e-mail is revolutionising our lives in terms of speed and volume of communication. As a means of information provision, the World Wide Web has enormous potential. And through its ability to bring like-minded people around the world together in discussion and sharing of ideas, Bulletin Boards open up endless new possibilities for academics, researchers, the business community and school-children alike.

The Internet is an opportunity for supposedly open government to become just that. In representative democracy, I believe that it is the right of every citizen to know exactly what their elected representative is doing on their behalf, and to have access to information about the process through which decisions are taken, as well as the decisions themselves. This is important not just in ensuring that our citizens are informed about the society in which they live, but it also gives them the opportunity to partake in the process through lobbying of their elected representatives, and ultimately through casting an informed vote at election time. Such participation is an essential pillar of democracy, as is the accountability that it helps to progress.

Nowhere is the *concentration of information* and *lack of dissemination* more perceived by our citizens than in the European Union. This information gap is very evident between Brussels and government, between Brussels and industry, and between Brussels and the citizen of the European Union. The European Union's strategies for concentration of information are not in my view based on any secretive intent however. They arise from the way in which the European institutions have developed, both in relation to each other, and in the way that they communicate with their citizens. The result of this information gap is clearly illustrated by the need to allocate an extra 50 million ECU (£42 million) for specific information activities in the 1996 European Union Budget (budget line B3-306), relating to such basic subjects as the Inter-Governmental Conference and Economic & Monetary Union.

It is such lack of information about Europe that enables half-truths and "Euromyths" to develop and Euroscepticism to flourish. I believe that Euroscepticism is a form of ignorance. If you provide people with access to full information, then they will be able to make informed decisions. The Internet can play an important role in informing our citizens, and can do so relatively cheaply. The cost of setting up and maintaining a web site is relatively small both compared to many other methods of communication, and in terms of the enormous benefit of having well-informed citizens. While the Internet may not yet be available to the majority of Europe's citizens, all that is changing.

It was the Labour Party's commitment at its 1995 Annual Conference to make the Internet available to all our citizens through a network of schools and public libraries that inspired me to set up my own web site. The rest of this article is dedicated to describing the system that I have set up and the cost of doing so. Many other MEPs are now in contact with my office with the intention of setting up their own web sites and hoping to learn from our experience. The more MEPs grasp this opportunity, the more information will become available to our citizens about the European Union across a broad range of areas.

Ultimately however, it is essential that the European Union's institutions themselves fully embrace this new technology by providing as many of their public documents as possible on the Web. To have such information theoretically available to the public through various EU databases, as at present, is not truly transparent given the costs of subscription to these databases and the way that they present information. The World Wide Web is an obvious forum for making this information available, and in so doing will not only make it available to a much wider audience, but it will also make it available to the general public rather than simply to those with a high-level professional interest in the activities of the EU.

The costs of providing such a service are not astronomic. For my own web site, the initial set up cost was £50. My monthly rental of the disk space required for the web site is £20, for which I am allocated 5Mb of disk space. To put that into more meaningful terms, I currently have over 350 pages of information within my web site, and have used less than a quarter of my 5Mb. The pages are accessed from citizens of all 15 Member States of the European Union and beyond. Since launching the service my pages have been accessed over 10,000 times, working out at an average of 300 a day for the month of January when the service was launched.

Annexed to this submission you will find the 'Internet Launch' pack that I produced in January 1996 for the launch of my web site (*not printed*). This gives further details of the reasoning behind my web site and what it contained at that time. The web site now contains 200 more pages than it did then, and the pages fall into the following categories:

— *My biographical details* (1 page)

— *Details of my staff* and who to contact for possible enquiries (1 page).

— Information on *how to contact my offices* in the UK, Brussels and Strasbourg, including by e-mail (1 page).

- The on-line version of my *monthly constituency* newsletter—Every article from the last twelve issues of "European Report" is contained within my web site. It can be browsed by date or by subject heading to make it as user-friendly as possible. This helps let my constituents know what I have been doing both in the UK and in Brussels/Strasbourg to represent them (102 pages).
- The on-line version of my *quarterly development newsletter* (10 pages).
- *European Parliament Part-Session briefings*—The European Parliament produces a full guide to every item to be discussed before each plenary session, and a summary report of every item discussed/voted following every plenary. Both guides are available in full on my web site, and for the session summaries, all of the 1996 plenary summaries are contained with a browsable subject index (211 pages).
- *My committees*—Full details and terms of reference of my committees, relevant documents for each committee and other items of interest (seven pages).
- *Fraud information wanted*—One of my main areas of interest in the European Parliament is in combating fraud. This page invites people to submit evidence to me in confidence, and enables them to do so completely anonymously through e-mail via an anonymous re-mailer (1 page).
- *Sports Intergroup*—The Sports Intergroup, of which I am President, meets in the European Parliament six times a year. My web site contains agendas and minutes for every meeting, as well as every document for the meetings. It also contains the verbatim text of the conference on the Bosman Case held at the European Parliament in November 1995 (16 pages).
- *EU Databases*—This page gives full details on how to subscribe from the UK to the various official databases of the European institutions (one page).
- *Links to other web sites*—These are split into EU level, national level and local level links to other web sites, ranging from the European Commission to the Labour Party's sister parties in the rest of the EU (2 pages).
- *Co-operative Party and Co-operative Movement*—I am elected as a Labour and Co-operative Member of the European Parliament, and my web site contains nine pages of information on the Co-operative Party and the Co-operative Movement in the UK and the EU (nine pages).
- *Declaration of Interests*—Although the Nolan Report has been passed in the House of Commons, levels of disclosure are not as formalised here in the European Parliament. I believe that every Member's interests should be fully disclosed and publically available. I am leading the way by making may own declaration available on the Internet (one page).
- *Join the Labour Party*—A link from my page to the Labour Party web site makes it easy for people to join the Labour Party.
- *Suggestions*—There is no point in having a web site unless it is built around the needs of those who use it. This page encourages users to feed in their ideas and comments (one page).

My web site is updated on a weekly basis, and so the above list will soon be out of date. I hope however that it illustrates the potential uses of the Web for providing information on a wide variety of EU-related topics. The best way to get a better picture of what I have described is to visit my web site. My homepage can be found at the following address:

http://www.poptel.org.uk/john/tomlinson/

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28 March 1996

Memorandum submitted by the Universities and Colleges Information Systems Association (UCISA)

The Universities and Colleges Information Systems Association (UCISA) represents the information service providers in over 90 per cent of UK Higher Education. Its members provide a wide range of high-level experience from the sector with the greatest experience of information superhighway use in the UK. It offers the following observations to the Committee.

1. The UK Higher Education community is particularly well provided with information superhighway access. The vision of the Computer Board for Universities and Research Councils in funding the JANET network in the 1980s and its successors the Information Systems Committee and the Joint

Information Systems Committee in extending this to SuperJANET has ensured this. All UK universities and colleges are interconnected at speeds of 2Mbps upwards, with onward international connections, giving this country perhaps the best connectivity of any in the world.

2. The Scottish Higher Education Funding Council has taken these developments a step further by encouraging HEIs to form city-based consortia to install advanced Metropolitan Area Networks (MANs), which interconnect HEIs at speeds of up to 155Mbps. In 1996, these MANs will be interconnected to provide the highest capacity country-wide network in the world.

3. The Higher Education sector has not confined itself to the provision of inter-connectivity alone. There has always been an emphasis on applications. For example:

   — The UK HE sector was the first community in the world to provide a country-wide electronic mail service.

   — The UK research community is particularly active in its use of the information superhighway for collaborative research.

   — Through funding from the Funding Councils' Teaching and Learning Technology Programme and elsewhere, network-based education has perhaps a higher penetration than in other countries.

   — The Scottish Higher Education Funding Council has followed up its infrastructure funding with a Use of MANs Initiative, which is funding collaborative projects involving video-conferencing and other advanced techniques in subjects from Anatomy through Music to Zoology. Some of these projects are part of global collaborations under the G7 Global Information Infrastructure Programme.

4. While this work has provided UK Higher Education with a significant lead, it has not been easy to transfer this benefit to other UK sectors, such as schools, FE and community colleges, and the industrial sector. This has been only partly due to funding constraints in these sectors. A more significant factor, which has inhibited HE from assisting other communities, has been the strict adherence to the constraint imposed by government funding rules, which mean that facilities provided from the HE budget cannot be used to support other communities. This contrasts markedly with, for example, the United States where many of the same funding principles apply, yet there is regular cross-community support. As a result, US schools are much better provided for than UK schools are much better provided for than UK schools. However, in order to support the wider communities, it would not be sufficient to relax constraints without providing additional funding. Such as approach would erode the valuable lead the HE sector holds over its foreign competitors.

5. The HE community has suffered from the effects of incompatible network standards in two broad areas. Both arise directly from the fact that our academic network have always been at the leading edge of the available technology. In the mid-1980s, there were no established standards for inter-connection, so the UK established its own "Coloured Book" suite, in parallel with the development of the IP suite in the United States. The UK protocols were in many respects superior to the US equivalent, but market forces favoured the IP suite, with the result that the UK community suffered several years of incompatibilities, until we fell into line in 1990.

6. More recently, there have been restrictions in the marketplace for ATM equipment where the demand for products has outpaced the development of standards. This has meant that inter-working of different manufacturers' equipment has created difficulties for a number of pilot projects. This is not a long-term problem, since all suppliers are committed to the adoption of standards, which will have stabilised by the time ATM is a commodity product. In fact, the information superhighway industry has collaborated well on the adoption of inter-working standards, which means that real difficulties are rare in practice.

7. A more serious constraint in practice, since the HE sector is in reality part of an international community, is the restricted capacity of international bandwidth. This is not only because of its expense, but also the inability, or unwillingness, of the PTTs to supply high-bandwidth links. The UK may be more aware of this constraint than other countries, since competition in the domestic telecommunications marketplace has driven down prices so that we are more used than other countries to cost-effective internal communications.

8. One of the lessons learned from involvement in leading edge network services is that the current Internet is not the true information superhighway. The current Internet is a remarkable development, which appears capable of considerable additional enhancement, yet it is not designed for extensive audio or video services. These will require a more advanced underlying technology, of which the most promising is Asynchronous Transfer Mode (ATM). However, for most of the community and in the context of most current experience, the Internet is the information superhighway. Many of the comments below will blur the distiction—partly because most ATM-based applications of which we currently have experienced are actually Internet applications running at higher speed!

9. We believe that it is important to separate consideration of the provision of infrastructure from the provision of access to services. In discussing concepts like "universal access", we are really concerned with access to the infrastructure itself, not in saying that every service should be equally accessible, regardless of need and ability to pay. An ordinary telephone analogy would be that every consumer in the UK is entitled to rent a telephone line at a consistent price, regardless of location, yet we do not claim that everyone should have automatic access to the premium rate 0891 services.

10. The UK must proceed as soon as possible to the installation of universal infrastructure, priced at a realistic level, in order to allow use by all. The UK is already behind its international competitors in the extent to which network access is available from homes, schools and community centres such as public libraries. As the world moves rapidly towards a knowledge-based economy, the UK cannot afford to disadvantage its citizens in this way. Nor can it afford to develop into information-rich islands in commercial communities and affluent suburbs and an information-poor hinterland in the disadvantaged city and country areas. It has no need to. Although the UK appears a country of rich vs. poor and crowded vs. empty areas, in global terms it is a remarkably compact, uniform country which can benefit relatively cheaply from the information superhighway. It does not have the vast empty spaces of countries like the United States or the low overall population density of France, for example.

11. The UK must recognise that it will import most of the basic technology. Even if we ever had a real opportunity to develop this capability, we lost the race many years ago. However, the UK does play a leading role in the development of technology. The researchers in our universities are highly regarded world-wide, although ironically our success in turning SuperJANET into an effective production network has deprived them of the quality testbeds available to their colleagues in the United States, since they can no longer be allowed to use the infrastructure experimentally. The inventor of the World Wide Webb, the "killer" Internet application is British. In BT, for example, we have a world class research and development capability. Despite the UK commitment to competition, we must ensure that these first-rate capabilities do not succumb to regulatory pressures.

12. Despite our ability to innovate, the sheer size of the United States and Far East home markets, together with the attitudes to commercial risk-taking in those communities mean that it is unlikely that effective competitors for eg SUN, Microsoft, Netscape or Bay Networks will emerge from the UK. Nor would any realistic amount of government support change this reality. We have shown, however, that UK companies, with appropriate support, can operate and compete internationally in well-chosen niche markets. Examples would include Spider Systems, although this successful British company has now been bought out.

13. The UK already provides an attractive environment for inwards investment. One reason is the quality of the education system, and the resultant attitudes of the workforce. Other parts of the UK, not currently favoured, could become so in the medium term on the back of the educational services which could be provided over information superhighway infrastructure in disadvantaged areas.

14. The conceptual separation of access and services would allow the UK to develop an area in which it already excels, namely services. Our universities and colleges are ready to develop educational materials for delivery over the superhighway to much larger communities than at present. In this, we would be building on the successful record of the Open University, but would be able to provide much more interactivity. The network would allow for differential charging for this material. It would be possible to subsidise access as a matter of policy to certain disadvantaged groups, in order to encourage them to increase their education in order to enhance employment prospects. The emergence of the international information superhighway would allow this material to be accessed world-wide, at a cost which would benefit the UK. Indeed, some fear that, if the UK does not build its own capability in this area, we will be vulnerable to the import of subsidised educational materials from abroad, undermining our native capabilities.

15. However, it is not only in educational services that we excel. Our network-based government information service, despite lagging behind the United States in its inception, leads the rest of the world in both quality and breadth of coverage. While this is not in itself a commercial opportunity, it could offer considerable savings in the provision of this information internally to UK citizens, as well as enhancing the image of the UK abroad.

16. Likewise, many of our commercially-based information services are of high quality. Our major newspapers are now available over the Internet to a significantly higher standard than their international competitors. The existence of a universal infrastructure in the UK would encourage other companies to develop comparable information services, for which they would naturally charge and for which consumers would undoubtedly pay. Moreover, the large home market thus assured would provide the base for global exploitation, again creating an export opportunity.

17. The development of an effective service provider market in the UK would thus enhance the opportunities for UK citizens, as well as having export earning potential. An example from an earlier era which enhanced UK prestige in this way is the BBC World Service.

18. The development of an effective information providing economy relies on a fair legal framework for the development of such services. At present, the legal framework, for example that associated with Copyright and other liabilities, may not provide adequate protection for the providers of information services, particularly for those which provide a secondary distribution service for primary providers. Entities at potential risk include bulletin board providers and network operators. The HE community has recently received legal advice which suggests that institutions may be exposed to considerable liability because of actions of individual students, for example, while in the US and elsewhere bulletin board providers have been held liable for information of which they could not reasonably have had knowledge. The UK would give itself considerable advantage with the adoption of a legal framework which removed these doubts, while of course retaining adequate protection for anyone who might be wronged by the publication of networked information.

19. One particular issue which arises from the dominance of the US in the commodity marketplace concerns the limitations which may be put on the use of the technology. An example is the Netscape browser, perhaps the most frequently used Internet software. Netscape's international educational licence contains a provision that the software may not be used by citizens of a number of countries, including a number which provide the UK with a significant number of students. We are faced with the choice of denying use of the software to all students (thus eroding our competitive position, because others are not), of ignoring the licence provisions or of discriminating against some of our students by depriving them of a useful tool. At first sight, the issue is the US Export Control Regulations, which restrict the export of certain technology. However, in many cases, it appears that the problem is not the Regulations themselves, but the interpretation put on them by cautious US lawyers, who advise their clients accordingly.

20. Similar difficulties are beginning to arise because of the US Government restrictions on the use of technologies, such as cryptography outside the US. Much software necessary to use the information superhighway contains this code, which puts the UK at a disadvantage. Any influence the UK Government can exercise to change this US attitude would be beneficial.

21. Our overall case would be that we operate in a global information economy. Some parts of this economy are dominated by other countries, in particular the US (for advanced products) and the Far East (for commodity manufactured products). It would be foolish to provide UK Government support to meet this competition head on. There are many areas in which the UK can be very competitive, particularly if we enhance the capabilities of our population by providing a universal infrastructure. Examples given are advanced applications, building on our existing leading edge capability; education, in which we have a global opportunity; and the provision of information services. Government support should focus on the exploitation of opportunities like these.

Memorandum by the UK Education and Research Networking Association (UKERNA)

The UK Education and Research Networking Association (UKERNA) is responsible for managing the networking programme for the UK university and research community. This is a well established programme that has existed for over 17 years. From 1979 to 1994 it was managed by the Joint Network Team at the Rutherford Appleton Laboratory and established a leading international position in the development and deployment of advanced networking technologies and applications. UKERNA has been created as a company limited by guarantee by the Higher Education Funding Councils to continue the management of the networking programme and to extend the programme into new sectors.

UKERNA offers the following observations to the Committee.

1. The Select Committee's call for evidence highlights a number of issues associated with applications of the information superhighway. The superhighway is not a well defined concept, which leaves plenty of room for debate and many contenders claiming to be the real thing. The real superhighway will be a pervasive, general purpose, multi-service, broadband digital network capable of supporting a wide range of applications. Such a network does not yet exist, the challenge is to be ready for it when it does.

2. The superhighway will create a global market place covering all the service sectors mentioned in the call for evidence. It will encourage many new service suppliers. Many new organisations and activities will be drawn into the unpredictable world of IT, traditional boundaries will become blurred and established organisations will be threatened by new and innovative competitors. Government has a key role to play in creating the right framework that will achieve an appropriate balance between competition and co-operation that will stimulate new initiatives and developments rather than constrain progress to traditional development channels.

3. The concept of an information superhighway derives from the convergence of several powerful driving forces which are bringing together developments in computers, consumer products, information content and telecommunications. The new ingredient in this mix is broadband long distance telecommunications based on optical fibre technology. This technology is developing rapidly and combined with the other driving forces will enable a wide range of new IT applications

that are expected to have a major impact on all aspects of human activity and which will be global in scope.

4. However, we do not yet know how to realise the full potential of these developments. Our thinking is conditioned by many years of using narrow band telecommunications where long distance transmission capacity is characterised as a scarce and expensive resource. We are now moving rapidly from a situation of scarcity to one of abundance and history tells us that such changes lead to unpredictable developments of major economic and social importance. The organisations (and countries) that can discover and deploy the new applications at an early stage will be well placed to play a major role in the global networked market place of the future. Those who rely on others to make the discoveries will be uncompetitive in the new market and will find it extremely difficult to make up the lost ground. Relying on the traditional approach to identifying and developing new applications is insufficient, most of the applications are beyond our imaginations. We need to encourage a culture of exploration that will unlock the new opportunities, and at the same time will bring about a fundamental change of thinking in many UK organisations.

5. This concept is well illustrated by the Internet, and in particular how new applications develop on the Internet. In addition to supporting a range of applications for a rapidly growing user community the Internet also provides a test bed for the development of new applications. Indeed these two roles are linked by a continuous process, new developments are introduced on a small scale and are progressively taken up by an increasing number of other developers and users. The developments are piloted in a real user community across a broad spectrum of users typically starting with the technically literate users who can cope with relatively raw technology through to the majority of users who are not technically literate and are seeking tried and tested facilities with good user interfaces and support. The developments are undertaken in a spirit of open co-operation, specifications and software are passed around on the network, new participants join the development activities and may as a result start new work which can sometimes lead to unexpected development paths. These activities are international in scope.

6. A good illustration of this process is the development of the World-Wide-Web. Originally developed as a networked information service in a research laboratory it was picked up by the Internet community as a way of providing inter-connected multi-media information services. Additional development work from several sources provided browser software for common personal computers and workstations. This software was made freely available over the network encouraging a large number of users to participate. The number and diversity of information services grew rapidly across the world involving a wide range of organisations including government departments, commercial organisations, museums, educational institutions and research laboratories. This success stimulated new development work in several directions; the development of more sophisticated browsers with 3-D and video imaging capabilities, security facilities to support financial transactions, options to restrict access to trusted servers to prevent school children from accessing unsuitable information, a range of searching and authoring tools, etc. In turn these developments will encourage wider participation which in turn will stimulate further development. The result will be a growing number of new commercial services with access to a large user community. This approach should be compared with the traditional method of developing networked applications which is more predictive, rigid and is largely based on incremental developments of existing applications.

7. The Internet approach exploits the availability of a large dynamic international community of developers and users interconnected by a versatile network. The process has been used for many years to develop the Internet itself and the range of applications it supports. The origins of the Internet lie in the university and research community which pioneered open computer networking and applications such as electronic mail and networked information services (including the World-Wide-Web). The quest for new applications continues with a wide range of activities exploring areas such as multi-media information services, group communication via-multi-media workstations and the broadcasting of lectures and seminars. It is therefore hardly surprising that the university and research community is pioneering the development and deployment of the first large-scale, general purpose broadband networks.

8. The UK university and research community deployed the first large-scale general purpose broadband network in the world—SuperJANET. This network has been available for over two years and is stimulating new developments in several areas. Other countries are following the UK's lead and the interconnection of these national networks will create the first general purpose international broadband network—a pilot information superhighway capable of stimulating and supporting a wide range of new applications. These developments should be encouraged and participation in them broadened to involve the widest possible community and accelerate the exploration process. The US understands the role of Internet-type developments better than any other country and this will allow them to achieve dominance in the information superhighway market place if the UK and other countries do not take appropriate measures to strengthen their positions. SuperJANET and related initiatives give the UK the opportunity to take a leading role in this crucial area.

9. The attached paper provides fuller account of the points made in this submission. Background information SuperJANET is also provided (*not printed*).

Memorandum by the University of Leeds

This submission of evidence is made on behalf of the University of Leeds, and incorporates the views of various members of the University.

We wish to comment, selectively, on the eight headings listed in the formal invitation to submit evidence by restricting our observations to those areas of special relevance to a higher education institution in a large metropolitan area.

1. We believe that the Joint Academic Network (JANET) (and its successor SuperJANET) represents a genuine national success story in the Superhighway arena and that it provides both a model and an exemplar for the UK in general. Higher education institutions have experienced a "step change" in their working environments through their ability to communicate effectively across local and wide areas of the fast and reliable connectivity provided through UKERNA. The benefits of the world-wide information explosion are now exploited at hundreds of thousands of UK desktops at extraordinarily low cost. It simply has to be seen, generically, as the way forward for the implementation of the UK's development of the international Superhighway.

One of the key lessons—perhaps the principal one—to be learned from the success of the (Super)JANET network, is that those responsible for the development of the service have had good and continuous communication with the service's users. This has to be a feature of any similar, associated, or extended national network if the same level of beneficial outcomes is to be achieved. Additionally, the open consultative, and genuinely responsive style of management and organisation of the service has been highly conducive to the fostering of collaborative developments of many kinds. This factor needs to be carefully borne in mind in any future publicly-funded network developments. In the context of the current "market-testing" phase for the operation of the JANET/SuperJANET service, this factor is difficult to cost, but it is highly valued and might be very difficult to replicate in purely commercial arrangements.

This is not to say, however, that commercial considerations cannot be fruitfully harnessed. On the contrary, it is clear that the high costs involved in establishing and maintaining a genuine Superhighway within the UK for the public benefit will require the involvement of a wide variety of public and commercial interests. HEIs are already collaborating with commercial companies on many fronts in their networked environment, and this experience should prove of great value in establishing mass connectivity for the population at large. The careful avoidance of incompatibility of standards within the JANET set-up, too , should stand as an object lesson for the provision of facilities for the much wider community.

2. (iv) In the field of education, we believe very strongly that government funds should be invested in connecting up schools and colleges to the Information Superhighway as soon as possible. Computer literacy needs to be replaced by 'information literacy', and the investment made, through the early acquisition of the transferrable skills involved in access to such a wide range of materials and information over the networks, would be more than returned in terms of employment opportunities and overall competitiveness of the available workforce. (Indeed, failure to make such an investment would lead directly to a loss of competitive edge against other countries.) Whilst a considerable amount of commercial involvement, through the economic delivery of products and services by the private sector, is to be expected and encouraged, it is our view that the bulk of the infrastructure costs should be met by direct government funding. A case in point is the need for the large-scale connection of public libraries to the Superhighway. The experience in that arena points very clearly to the need for national initiatives, possibly through the funding of the new Library and Information Commission at an appropriately increased level, enabling it to act as the pump-priming funder of such initiatives. With such an investment of public funds guaranteed, there would undoubtedly be an inward flow of private funds to support further desirable developments.

(vi) It is our view, in relation to health information on the Superhighway, that as many barriers to the free flow of health-related information as possible should be removed. In this respect in particular, we beg to suggest that the understandable concerns of the NHS about security of information are at present unnecessarily constraining on the potential for interconnectivity with other parts of the public domain.

3. The suppliers of services on the Superhighway will consist of a healthy mix of public and private concerns, and every effort should be made, in our view, to encourage this type of diversity. Whilst the legitimate interests of rights holders must be safeguarded (and we expect this to be through a variety of mechanisms, chief among which perhaps will be licence arrangements), it will be necessary, in the public interest, for restrictions or controls on the use and re-use of information available on the Superhighway to be as unconstrained as possible at the point of use. Unreasonable restraints, on pseudo-commercial grounds, will need to be firmly discouraged, or the value of the Superhighway will be seriously undermined.

4. "Universal access to services provided for the common good" is precisely the term we would apply to the situation which prevails in the JANET/SuperJANET environment. Whilst it cannot be said to be set within "a commercially competitive market framework", it has elements of that kind of context, and again points the way to a successful 'mixed economy' of public and private interests and funding streams. The key, perhaps, lies in the *regulation* and *control* of recognised service providers, and in the rôle of community brokers,

exercised by such bodies as CHEST and, more recently, by JISC and its sub-committees, which have negotiated beneficial service and bulk-purchase agreements with numerous commercial suppliers. The successful HE model points towards regulation, negotiation and collaborative agreements, in the interests of the public good. Copyright restrictions can usually be resolved at an acceptable price!

6. (See our comments on the possible rôle of the Library and Information Commission at 2, above.)

7. Our long experience of the use of local and wide area networking leads us to stress, above all, the importance of appropriate training in the use of the new technology. It is one thing to change working practices (often to revolutionise them); it is quite another to do it cost-effectively; and in this arena training is the key to success. The comment about the need for "information literacy" above is not an idle one: it will, in our view, become the key educational and training issue of the new millennium.

Without it being seriously addressed and adequately resourced, the users of the Information Superhighway will be as disenfranchised as if they had been set free in a library without ever having been taught to read and write. We urge, very emphatically, that adequate provision be made for the resourcing of appropriate training in the use of information as well as for the technical support required to maintain the software and the hardware required for public access to the Superhighway.

R. P. Carr
Dean of Information Strategy and
University Librarian

29 February 1996

Letter from the University of Oxford

Thank you for your letter of 19 December inviting the University to submit written evidence to the enquiry. I apologise for the late submission of these comments, however my colleagues in the IT sector wished to have the opportunity to see the comments of UCISA (the Universities and Colleges Admissions Systems Association) before advising me on a reply, and these have only recently become available. I understand that colleagues in the sub-faculty of Economics will be commenting separately on economic applications of the Information Superhighway. It seems appropriate to confine our comments to supplementing those UCISA, which, in general terms, we wish to endorse. The numbers below refer to those in the UCISA submission.

10: INSTALLATION OF UNIVERSAL INFRASTRUCTURE

To date, the development of services in the academic sector and also more generally has been essentially market-driven. The applications developed thus far have been unidirectional, and government intervention may well be necessary to reach the next stage, of inter-active technology, partly because the short-term returns on investment in the infrastructure required might be expected to be relatively modest and this might rule out a leading part being played by the private sector. However, there can be no doubt that we must move to the stage of inter-active technology to realise the potential benefits of the Information Superhighway.

14: UNIVERSITIES AS SERVICE-PROVIDERS

These comments have a special applicability to universities such as Oxford, which are guardians of rich information sources. In addition to the holdings of our libraries and museums, University Presses are an important information source.

15: GOVERNMENT INFORMATION

While the UK's service may be second only to that of the US, we feel that high priority should be accorded to making primary information (such as Hansard and legislation) available through the Information Superhighway. In general terms, wherever possible, data collected by the government—such as census data—should be in the public domain and the information superhighway is an extremely cost-effective way of making such information accessible. It is also a cost-effective way of disseminating information about regulations and services.

18: THE LEGAL FRAMEWORK

We are particularly concerned about the future role of copyright deposit libraries, of which the Bodleian is one. Issues of special interest include arrangements for the deposit of material in new media, and for the archiving and preservation of material published solely electronically. It seems probable that the higher education sector will have an important role to play in relation to the preservation of material.

Finally, the social implications of the development of the Information Superhighway need to be addressed with great care. Better access to information undoubtedly will change working practices, perhaps most notably by making the location of workers more incidental. It can be expected to reinforce the trend towards home-working and this will have broader social implications. The development of the Information Superhighway has been likened, in the degree of upheaval it will cause, to the Industrial Revolution; it must be borne in mind that development will proceed a great deal more rapidly than was the case with the Industrial Revolution. We very much welcome the interest of the European Commission in striving to lessening the amount of economic and social upheaval caused by developments in this area.

Dr Peter North
Vice-Chancellor
7 February 1996

Memorandum by the University of Warwick

The University of Warwick is pleased to submit evidence to the enquiry into the Information Superhighway: Application in Society. For ease of reference the Sub-Committee's questions are included in this paper (italicised); we have however not attempted to address all parts of the questions, but instead concentrated on those aspects of the enquiry which are particularly relevant to the University's place and mission in society.

1. *What is the current form of the "Information Superhighway", and how is it developing (i) in the United Kingdom and (ii) worldwide? What specific problems arise from incompatible network standards and why are these incompatibles arising?*

The concept of the Information Superhighway is currently best exemplified by the Internet. The Internet is in fact an interlinked set (or perhaps hierarchy would be a more descriptive term) of distinct networks, each individually managed, which use the same network protocols and interwork relatively transparently.

Even in the UK there are several networks each forming part of the Internet, the two largest components being the academic and research community network—also known as JANET or SuperJANET—and the commercial domain. These are themselves composed of large numbers of institutional level networks. To illustrate the hierarchy in the academic/research domain, one institutional network would be the University of Warwick campus network, and within the institutional network again there exist local sub-networks such as departmental networks. Similar situations exist in the US and other countries. However the key point is that the whole of the Internet appears seamless to a user wherever that user's host system is attached.

Within the Internet most of the basic standards are well established and interworking problems are few. Difficulties arise where active development is taking place and standards are emerging in practical use but are not yet fully defined and ratified. Examples are (a) the next generation of mark-up languages (HTML3) used to construct documents on the World Wide Web, where different features and extensions are being introduced by different software writers and not all Web browsers will display a particular document; and (b) the developing technologies for commercial transactions over the Internet, where there is a proliferation of approaches and unless or until a small number of leading products emerges, the situation is very confusing to would-be customers.

The principal threat to standards is likely to arise from companies large enough to impose their own proprietary standards on their users. In the past IBM's networking standards came into this category, but this particular threat has now virtually disappeared. Microsoft is probably now the one company potentially capable of destroying open network standards through the creation of its own network with its own proprietary standards.

Finally it is worth saying that while the Internet is the best working model we have for the Information Superhighway, and the only sensible strategy is to build on what the Internet has already achieved, the superhighway concept implies more than the present Internet. What is needed is a true multi-service network in which there is adequate bandwith for demanding real-time media (ie sound and full-motion video) alongside more conventional computing technology.

2. *What services are being provided, and (should be developed/will be required), within for example the following areas:*

(i) public information,
(ii) commerce,
(iii) finance,
(iv) education,
(v) industrial training,
(vi) health,
(vii) social services, and
(viii) entertainment?

Services will be found under all these headings somewhat on the Internet, often in an embryonic form. For example, it is possible to register for an MBA degree via the Internet and thereafter carry out the great majority of the course assignments over the network. One of the key problems of the Internet, however, is that at present the services and the information concerning their whereabouts are unstructured and of highly variable quality. The potential of the Information Superhighway will only be released when these problems of quality control and resource discovery are successfully tackled.

In most areas growth of services will occur naturally as a consequence of commercial factors. The commerce, finance and entertainment sectors are already expanding their services via the Information Superhighway as a means of increasing sales. Sectors not so directly influenced by commercial pressures are the ones where development of services will need to be stimulated.

Provision of public information via the Superhighway is to be encouraged since (a) it is cheaper to provide in this form and also easier to keep up to date (no printing and distribution costs, or need to reprint as information changes); and (b) it can be made more widely available without constraints of time and place. Furthermore where printed versions are still to be published, the availability of an electronic version can actually increase sales by giving readers the ability to identify and browse the publication before taking the decision to purchase.

3. *Who will supply these services to consumers in the United Kingdom? How can the participating companies be categorised and what is the nature of the commercial relationships between them? How are suppliers likely to develop? What service standards exist and how are they likely to evolve?*

The Internet had its origins in the academic and research communities, and is still, probably, more heavily used by those communities than any others. The burgeoning commercial and recreational uses of the Internet are putting its infrastructure under intolerable strain. Greater capacity, and improved quality of access for the general public, are urgently needed. The international links are a notable bottleneck within the existing Internet. This growth cannot realistically be funded except with the participation of commercial suppliers, who will naturally expect a return on their investment.

The provison of the immediately visible service to the consumer, and the provision of network infrastructure and ongoing supply to the consumer, come into separate categories. Take telephone banking as an analogy: it is banks which provide the consumer service, but the telecommunications carriers which provide the infrastructure (the telephone network) to enable the consumers to access the service. With high speed data networks, few suppliers are in a position to provide the infrastructure which can deliver high bandwith to the consumers—the cable TV companies, and the major telecommunications carriers (BT and to a lesser extend Mercury). Many can provide the real consumer services. It is therefore the area of network access where regulatory provisions are most required because of the near monopoly situation.

We comment further on some of the models which might be developed in the community interest in the answers to some of the other questions.

4. *How can universal access to services provided for the common good be secured within a commercially competitive market framework?*

One possibility is that high bandwidth multi-service networks could be set up on a regional basis, with the active participation of the appropriate local authorities, to provide both commercial and public services. The overall cost would be covered on a subscription basis, so that private sector finance would be attracted by providing services for which commercial bodies were prepared to pay. This model is being actively pursued in our own region by the Coventry and Warwickshire Partnership, of which this University is a member.

One reason why public sector involvement is so important is that for certain services the people who most need access are those least likely to be able to afford it. A particular example is access to employment and trainig information for the unemployed. Access to the information might then be usefully provided at Libraries, Employment Offices and Community Centres.

5. *Whst is the rôle of central Government in connection with the "Information Superhighway" service provision, including the following areas:*

(i) leadership;

(ii) promoting inward investment;

(iii) promoting and safeguarding the interests of UK firms worldwide;

(iv) promoting network compatibility;

(v) access to Government information;

(vi) security of payment;

(vii) data protection, confidentiality and censorship;

(viii) verfication of information;

(ix) promoting the development of UK-orientated software?

In our view it would certainly be useful for central Government to provide leadership. Improving access to Government information is also to be encouraged. In other words objectives (i) and (v) can be furthered by the Government's own use of the network. The service offered *via* "open.gov.uk" is a start in this area: government press releases from many departments are now available via the World Wide Web. As we note elesewhere, expansion of the amount of information available over the Information Superhighway can lead to wider availability and efficiency savings.

Involvement of central Government in many of the other areas could be problematic as the Information Superhighway, to be meaningful, must continue to be global in concept and UK-specific (or even European) solutions to the technical problems listed—eg network compatibility, security of payment, or verification of information—will be of little or no value if they do not correspond to world-wide standards. At the same time it is important that British, and indeed European, interests are fed into the standards process. Arguably the best way to further objectives (iii), (iv) and (ix) is by ensuring UK representation on the bodies, such as (currently) the Internet Engineering Task Force, which are responsible for the Internet's standards.

Central Government policies—as distinct from technical solutions—should certainly be considered in (a) the regulatory area and (b) the areas of copyright, data protection, confidentiality and censorship.

As regards (a) it is clearly important to ensure that any infrastructure provision which may be largely or wholly funded commercially has associated with it a commitment to support access to public services as well. Thus any high-bandwidth links to domestic premises, installed perhaps by telecommunications carriers with the primary purpose of generating revenue from the supply of entertainment, should give access to the sources of public services as well. There are models in broadcasting and the telecommunications industry which could be used as analogies in this regard: expecting all Superhighway activities to be directly funded from chargeable services would be akin to a broadcasting regime consisting only of satellite and cable services, ie lacking not only the BBC but ITV also.

On (b), it is important that Government policies are established (backed up by legislation if need be) which give private organisations the confidence that privacy can be maintained where there is a need for this to be so. This should extend to surveillance by central Government itself, except where an over-riding national interest can be established. Legislation to outlaw the use of strong encryption technologies by private organisations or individuals would in our view be counterproductive (as well as probably unworkable).

A review of copyright law to take account of the age of electronic information is also badly needed. This is too complex a subject to expand upon in this submission, but we wish to emphasise that any such review should not be dominated by the interests of large commercial suppliers whose main concern, naturally enough, will be to protect their revenues at the expense of ready access to information. Historically copyright law has been a balance between protecting the interests of the copyright owner and the interests of the public, and this balance needs to be preserved.

6. *What is the rôle of local and regional Government in connection with the "Information Superhighway"? How can new services be used to boost (a) the ongoing regeneration of urban areas, (b) other local economies?*

Our belief is that local/regional organisation is likely to be the most cost-effective level at which to set up a '"mixed-economy" network, as noted in the answer to Question 4. Among the services which could assist urban regeneration are IT-based approaches to business information services (including especially the support of SMEs), electronic commerce, and the employment market.

In a similar vein the inherent ability of networked information systems to overcome constraints of time and place offers many new opportunities for work to be carried out by home-based workers in rural communities. Provision of both business information and public services to rural areas via the network could prove an important stimulus to rural areas with beneficial effects on the incidence of commuter travel, traffic pollution etc.

Local and regional Government can widen the availability of the services discussed by provision of access points in public libraries, community centres etc.

7. *What will be the impact of the "Information Superhighway" on working practices and employment practices?*

It is likely to fuel trends which are already with us as a consequence of earlier development in information technology: the trans-national nature of much of business and commerce, the polarisation of the employment market between the skilled workforce (ie with skills in the areas of technology and information handling) and the long-term unemployed who lack these skills, and the phenomenon of large numbers of part-time and increasingly home-based workers. On a more positive note, the information superhighway can offer increased opportunities for retraining throughout an individual's working life, again often by means of private (ie home-based) study.

8. *Is the dominance of mass-market US software a threat or an opportunity? What hard commercial initiatives can be made (as opposed to "collaborative ventures such as RACE or ESPRIT) to respond to this dominance?*

If by "the dominance of mass-market US software" is meant the dominance of for example Microsoft and Apple in the personal computer arena, we consider this only mildly relevant to the issues under discussion. Much of the underpinning software which drives the Internet has been produced by small groups and much of it continues to become available in the public domain or at low cost. The real threat from the large corporations (notably Microsoft) is that they will attempt to establish closed networks over which they have control, and from which other information providers—including public services—are excluded. The dangers of market dominance in the provision of information to the home, especially driven by home entertainment, are all too real and represent a threat which must be resisted by whatever means are available, eg Government regulation.

17 January 1996

Memorandum by the Welsh Office

1. This constitutes the Welsh Office response to the Committee's 19 December call for evidence. It addresses Welsh aspects of the enquiry; it does not address policy areas where the lead Government responsibility lies with another Department.

GENERAL

2. The challenges and opportunities of the Information Society have been well rehearsed elsewhere. In addition to the potential benefits to Welsh business and society generally, it is worth highlighting the potential for the new technologies (for example, to enable teleworking) to put rural areas on an equal footing with urban zones in terms of both business development and service delivery. Potentially this could promote more even economic development within Wales and also between Wales and other regions of the UK or the world.

EXISTING INFRASTRUCTURE AND SERVICES

3. The main infrastructure available in Wales is:

(a) General availability of ISDN2 (Integrated Switched Data Network) quality phone lines (which are adequate for many applications). ISDN2 is currently available within four kilometres of all phone exchanges. Higher capacity ISDN and other services (for example SMDS—Switched Multi Megabyte Data Service) are also available.

(b) Three cable franchises let across South Wales meaning that by 2002 over half a million homes will have access to cable TV and high quality telephony services delivered by cable companies.

(c) The possibility of other areas being served by radio fixed access services in the 2 GHz and 10 GHz band widths.

(d) A plan to ensure that at least 130 business parks are cabled over the next three–five years.

(e) A broadband link between every district general hospital site delivered by the digital all-Wales network (DAWN).

(f) With two exceptions (these have access to JANET) all HE institutions in Wales have access to SuperJANET and all FE institutions in Wales are scheduled to receive connections to JANET by the end of 1996.

(g) The Government Data Network is widely available to provide broadband links between Government Departments in Wales and to other UK Departments.

4. Services of note available in Wales are:

(a) The pilot telemedicine project in Mid Wales which links GP surgeries and hospital sites and permits remote diagnosis of dermatological conditions.

(b) Ready access to the Internet for small firms. In particular the WDA sponsored "Network Wales" has encouraged small firms to establish a presence on the Internet.

(c) A higher density of telecottages/telecentres than any other part of the UK with a marketing strategy designed to bring work into those centres and their associated teleworkers.

(d) Welsh Office information available on the Welsh Office's own Internet server.

(e) Wales Information Network (WIN) managed by the Wales Council for Voluntary Action provides information and accents a wide range of voluntary organisations.

WELSH OFFICE ROLE

5. The main priorities for the Welsh Office have been:

(a) To establish its own server to demonstrate central Government commitment to new technology.

(b) To demonstrate the potential of the new technology to small firms and to encourage them to take up an Internet presence.

(c) To establish a network between all elements of the multimedia industry, notably through the new media development group organised by the WDA.

(d) To offer strategic development scheme capital monies to local authorities who could make a case that the installation of broadband networks in their areas required some central subsidy.

(e) To encourage particular areas to develop a multimedia expertise where that appeared reasonable—for example in the South Gwynedd partnership area or in the West Wales Task Force area.

(f) To support the Library and Information Services Council (Wales) in establishing a Library Information Plan (LIP) for Wales, a strategy to coordinate all library and information services throughout Wales.

Memorandum by Virtual Precincts Limited

VIRTUAL PRECINCTS LTD

Virtual Precincts Ltd. (VPL) is a new limited liability company set up as a commercial operation to take advantage of the opportunities created by the development of the information superhighway. The company's board of directors is:

Lord Renwick	Chairman
Alan Leibert	Managing director
Adrian Norman	
Rowland Braby	

The company has decided that its first operation in this business will be the provision and operation of multimedia, public access kiosks sited in the high street and other public places such as railway stations, offering the goods and services of a series of different companies for sale at the kiosks through "virtual shops" on a "virtual shopping mall". Customers will be able to enter virtual shops, browse goods, select purchases, make payment with a credit or debit card, and arrange for collection or delivery. In this role, Virtual Precincts Ltd will act as a system operator.

In order to facilitate this system, a high bandwidth data path, or information highway, is required to operate between a central database site and the kiosks. VPL will initially make use of data channels provided by the cable television network providers.

Given the success of the initial pilot, VPL will expand its kiosk service nationally and move into the provision of similar services to the home via home PCs and home television sets equipped with an appropriate set-top box.

SUMMARY OF SUBMISSION

1. The provision of specific services via the information superhighway depends upon the availability of a three tier structure:

- Provision of a communications infrastructure by the communications industry
- The presence of service enabling organisations known as systems operators
- The development of a series of service providers to offer specific services

This hierarchy depends upon the provision of the first tier, the communications infrastructure which is not currently present in an appropriate form and which requires government stimulation to facilitate its early creation.

2. The existence of US domination in the cable television industry in the UK, and the US domination of the software industry world-wide are not impediments to UK exploitation and success in the information superhighway. The US is effectively providing the enabling technology for the provision of specific services. What is important is that UK companies become successful service providers, since the successful service provider will have access to a global market through the information superhighway.

To achieve this, potential service providers must be encouraged to develop their content and start offering their service at the earliest time. UK industry is well placed to get on with this work but has little time left to complete its task. The early development of a satisfactory communications infrastructure (see 1 above) is a critical factor in giving potential UK based service providers the opportunity to develop products before others.

MAIN SUBMISSION

1. The information superhighway means the ability to move data around a network at a sufficiently high speed such that multimedia capability can be achieved. That is, the nature of the data transmitted could be any or all of text, graphics, video and audio.

At present this capability is being developed piece-meal in the UK by the cable television industry and the traditional telecommunications companies such as British Telecom. Being competitive organisations, there is very little coming together or consensus among players. At this time wideband networks requiring inter-connection between providers are difficult to achieve.

2. In order for a variety of different services to be provided over the information superhighway, a three tier infrastructure is required.

— A wideband communications network provided by the communications industry offering a complete service including individual access points, systems inter-connection and a high speed backbone service.

— Various system operators who will act as facilitators for specific services. For example, Virtual Precincts Ltd sees itself as a systems operator providing virtual shopping malls on the information superhighway, including the mall itself, payment services and fulfilment of orders placed.

— Service providers offering a range of specific services making use of the facilities offered by systems operators within a superhighway provided by the communications network providers.

3. In the UK we are quite some way from the ability to provide a credible national information superhighway on which service providers can offer their services. There are no fixed standards within the communication industry that cover the requirements to create an interconnected information superhighway, although there are a number of alternative standards that could be applied given the agreement of the different operators.

However, it is suggested that a new standard be created to take advantage of the latest developments in technological capabilities and service requirements, including digital television. Given goodwill by all parties, and driven by the commercial opportunities being created by the information superhighway, it is thought that a good working standard could be created without difficulty.

As far as the service provider is concerned, a lack of definitive standards applies across the board, which is only to be expected in such a fast growing industry. Other standards that will have to be defined or accepted *de facto* include standards for handling remote credit card transactions over the information superhighway, and EDI messaging standards for routing, ordering and fulfilment information.

4. There needs to be an early recognition that the development of the information superhighway will lead to an expansion of service available in the home and that this will cause an early convergence of digital and analogue services, where digital services are characterised by computer data traffic, ISDN telephone services and the Internet, while analogue services are characterised by low speed telephone services, television transmission and fax.

What is required is an integrated service, from a number of competitive providers that can offer the total requirement. It is evident that this service will be digital and that analogue requirements will be transmitted using digital channels. At the local level the integrated service will need to operate at about 25 Mb/s (megabits of information per second), while at the backbone level the operating speed needs to be a minimum of 155 M/bs. It should be noted that using the latest ATM (asynchronous transfer mode) switching systems, these speeds are readily achievable today. In fact in Germany, Deutche Telecom is already providing a 400 M/bs backbone ring around the country.

5. Central Government attitudes and actions are pivotal in making all this happen.

— Central Government must provide a stimulus to the development of all tiers in the industry. This could be achieved by central government stating its desire to provide a service over the information superhighway. The potential income streams to system operators and network providers will create the necessay stimulus to action, subject to long term commitments and funding support.

— British Telecom, other telecommunications providers and the cable television industry all require deregulation to create a common marketplace. There is sufficient market size, both in the UK and abroad to allow a healthy range of such companies to prosper, although there will inevitably be some level of consolidation. Given deregulation, a level playing field will be created that will lead to the early development of standards and interconnect arrangements among the players.

— Special support needs to be given to the cable televison industry. At present they have a commitment to homes passed which necessitates a very heavy investment on their part and which will only be recouped over many years of service provision. In order to minimise costs, the cable television industry is implementing the minimum level of service and installing the minimum of hardware capability. In general, this capability does not allow bi-directional interactive wideband services. That is, they are unable to support the requirements of the information superhighway using presently installed equipment and another major investment will be required to enable the required facilities. Without central Gvoernment action, the cable television companies will not be motivated to make the necessary investment until they have recouped their existing investment. These timescales are not acceptable.

— The technological issues concerned with remote payments, payment security, data protection, confidentiality and censorship have all been solved. What is required is for central Government to take a position in these matters and to legislate accordingly.

6. The information superhighway offers exciting opportunities for local Government. Given the availability of an information superhighway, local Government may use this medium to carry out that part of its duties which demand the dissemination of information to the public. Costs will be dramatically reduced and the access to the public dramatically increased, especially where the local Government service sits alongside attractive commercial services such as home shopping.

Local Government may also act as a catalyst for regional promotion and urban regeneration. Within a regional information superhighway presence, local Government may organise the promotion of local amenities, local shops and local services. The multimedia nature of the delivery environment means that digital maps may be used to show locations, links to public transport information can be used to generate transportation information, while video clips may be used to enhance the desirability of the services on offer.

While much of this information will be destined primarily for kiosks and homes within the region, once on the information superhighway, some or all of the information may be made available nationally or even globally. Where desired, emphasis can be placed on the attractiveness to outside investment.

7. The question of working practices and employment effects can always be argued both ways and it is supposed that the prime drivers of opinion will be political bias and personal knowledge. However, certain factors are clear.

— Many new jobs will be created by the information superhighway.

— Some job losses are bound to occur in traditional areas that may be impacted, including perhaps retail sales. It must be recognised that these jobs will go regardless of any specific action by UK Plc since other countries will be offering their services over the information superhighway. It is important therefore that the UK acts quickly to make sure that any negative impact is offset as far as possible by new job development in the UK through the development of the information superhighway.

— The capability to create a low cost, high capability teleworking infrastructure will mean that much of the UK's talent which would otherwise not be able to take a job, may now usefully be employed in part time or full time, home based services.

— It has always been noted that the young take to new innovation more easily than the mature. Such is the case with the information superhighway. It is to be hoped that the widespread availability of access to the information superhighway will create a desire for students to improve their education to a level that will enable them to make full use of the information superhighway. The use of the information superhighway throughout all levels of education will serve both to educate and to create the desire for education.

8. The dominance of the US in the software industry, and in the UK their dominance of the cable television industry, is seen as an opportunity rather than a threat. While it is conceded that the provision of enabling technology will in general come from US companies, this is only a fraction of the total marketplace. The big market is in the provision of service—globally. The information superhighway itself must be seen simply as the facilitator of service provision world-wide.

It is a matter of top priority to make sure that UK Plc produces as many service providers as possible as quickly as possible. The global nature of the marketplace means that the opportunities are enormous but that the competition will also be great. Speed to the market is critical, followed only by the excellence and desirability of the service on offer.

In the UK we have great strength in technology and content, while our global marketing skills lag somewhat behind other countries. Nevertheless we do have what is required to win out in this market, if only we can get there quickly enough. To achieve this, we require stimulation through financial support, and it is to be recognised that many of the best service providers will be generated out of small business ventures that will require financial support.

In addition, without the availability of an acceptable information superhighway in the UK, these potential service providers will have no way of bringing their product to the market. This brings us back to the need for central Government to stimulate the early creation of an appropriate superhighway communications infrastructure in the UK (see 5 above).

Companies such as Virtual Precincts Limited are waiting in the wings for the provision of service capability. As soon as this happens, VPL will become fully active both within the UK and abroad. VPL has had numerous inquiries from companies wishing to act as service providers and offer their services on the information superhighway. We, like so many others are waiting for the communications industry to provide us with the capability we require, which will only happen quickly with direct central Government involvement and stimulation.

Printed in the United Kingdom by HMSO
19585 C6 5/96 246486

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ISBN 0 10 478296 X